Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

May 31, 2019

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
237 Godfrey Road East, Weston, CT 06883
Latitude: 41.2422220000
Longitude: -73.3644440000
T-Mobile Site#: CT11121C – L600

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 185-foot level of the existing 185-foot lattice tower at 237 Godfrey Road East, Weston, CT. The 185-foot lattice tower and property are owned by the Town of Weston. T-Mobile now intends to replace six (6) of its existing antennas with three (3) new 600/700 and three (3) new 1900/2100 MHz antenna. The new antennas will be installed at the same 185-foot level of the tower. T-Mobile is also proposing tower modifications on lattice tower from 40' through 120'. As shown on the enclosed structural modification report.

Planned Modifications:
Tower:
Remove
(3) 1-5/8" Coax

Remove and Replace:
(3) AIR 21 KRC118046-1_B2P_B4A Antenna (REMOVE) – (3) AIR 32 1900/2100 MHz Antenna (REPLACE)
(3) LNX-6515DS Antenna (REMOVE) – (3) RFS APXVAARR24_43-U-NA20 600/700 MHz Antenna (REPLACE)
(3) RRUS11B12 (REMOVE) - (3) Radio 4449 B71+B12 (REPLACE)

Install New:
(3) 1-3/8" Hybrid Cables

Existing to Remain:
(3) AIR 21 KRC118023-1_B2A_B4P 1900/2100 MHz Antenna
(9) 1-5/8 Coax
(3) TMA
(1) 1-3/8" Hybrid Cable

Ground:
Install New: Equipment inside existing 6102 cabinet

This facility was approved by the CSC for T-Mobile use in TS-T-Mobile-157-060907 dated October 2, 2006. This modification complies with this approval. Please see the enclosed.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman -Chris Spaulding, Elected Official, and James Pjura, Zoning Enforcement Officer for the Town of Weston.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S;A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kyle Richers
Transcend Wireless
Cell: 908-447-4716
Email: krichers@transcendwireless.com

Attachments
cc: Chris Spaulding- Weston First Selectman
James Pjura– Weston Zoning Enforcement Officer

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Friday, May 31, 2019 1:16 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11121C CSC EO

You have a package coming.

Scheduled Delivery Date: Monday, 06/03/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424291051355
Ship To:	Chris Spaulding Town of Weston 56 Norfield Road WESTON, CT 068832225 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	06/03/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11121C CSC EO

Download the UPS mobile app

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Friday, May 31, 2019 1:17 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11121C CSC ZO

You have a package coming.

Scheduled Delivery Date: Monday, 06/03/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424291597365
Ship To:	James Pjura Town of Weston 56 Norfield Road WESTON, CT 068832225 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	06/03/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11121C CSC ZO

Download the UPS mobile app

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The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2018.

Town of Weston, CT

Information on the Property Records for the Municipality of Weston was last updated on 5/22/2019.

Parcel Information

Location:	237 GODFREY ROAD	Property Use:	Public Use	Primary Use:	Governmental Building
Unique ID:	E00131	Map Block Lot:	16 1 35	Acres:	57.35
490 Acres:	0.00	Zone:	C	Volume / Page:	0074/0498
Developers Map / Lot:	1957	Census:			

Value Information

	Appraised Value	Assessed Value
Land	2,198,320	1,538,830
Buildings	37,330	26,130
Detached Outbuildings	76,175	53,320
Total	2,311,825	1,618,280

Owner's Information

Owner's Data
TOWN OF WESTON LANDFILL/TRANSFER STATION 237 GODFREY RD WESTON CT 06883

Building 1

Category:	Office	Use:	Office Building	GLA:	220
Stories:	1.00	Construction:	Reinforced Concrete	Year Built:	1980

Heating:	Forced Hot Air	Fuel:	Oil	Cooling Percent:	0
Siding:	Reinforced Concrete/Reinforced Concrete	Roof Material:	Asphalt	Beds/Units:	0

Special Features

Attached Components

Type:	Year Built:	Area:
Frame Garage	1980	506

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Average Work Shop	1980	207.00	0.00	207
Detached Garage	1992	912.00	0.00	912
Generator	2019	0.00	0.00	0
Paving	1980	19,000.00	0.00	19,000
Frame Shed	1980	676.00	0.00	676
Frame Shed	1980	460.00	0.00	460
Frame Shed	1980	288.00	0.00	288

Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
TOWN OF WESTON	0074	0498			No	$0

Building Permits

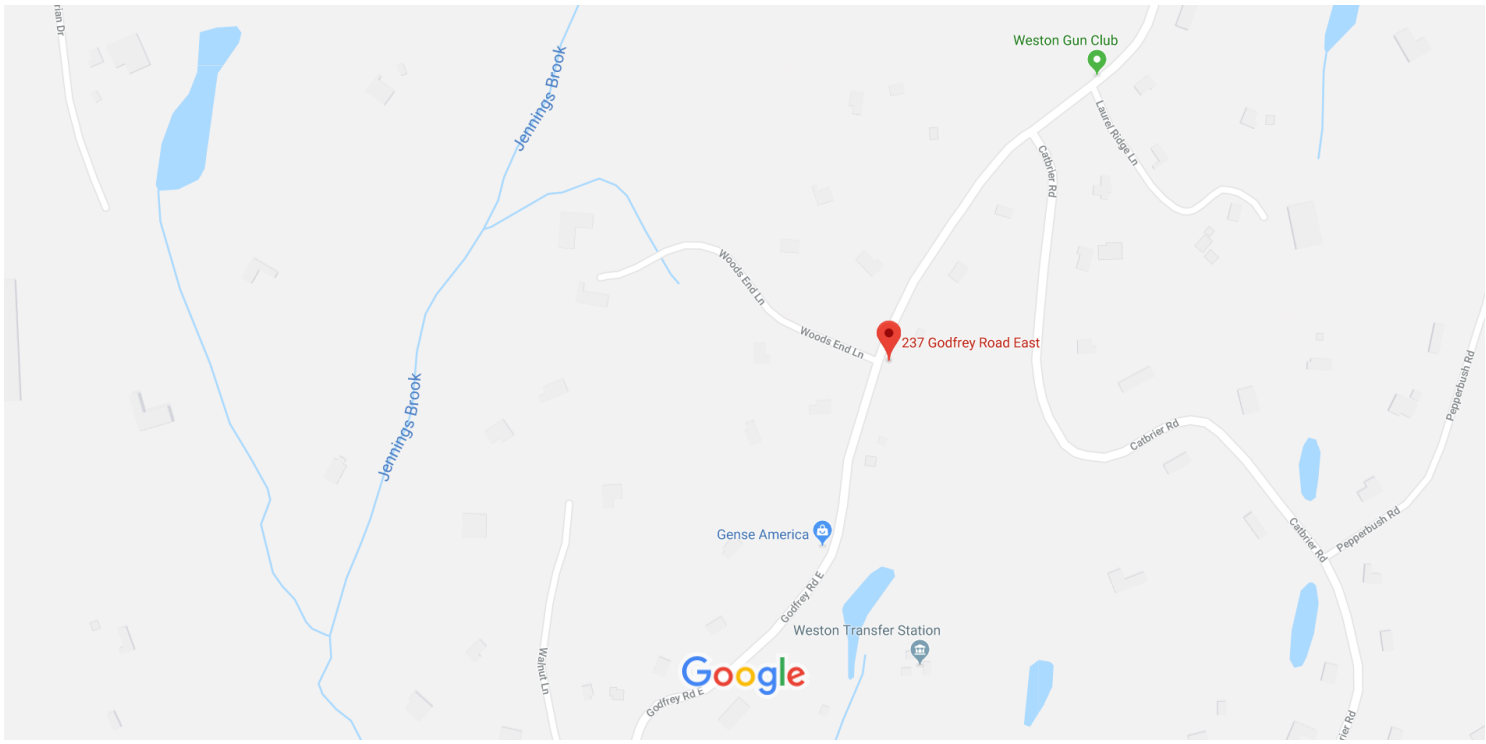
Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason
8177	Building	01/07/2019		Closed	AT&T TO SWAP ANTENNA
8011		12/13/2017		Closed	SPRINT WIRELESS INSTALL
7891		04/17/2017		Closed	ADD 3 ANTENNA
7486		11/24/2014		Closed	SEE PERMIT
7293		06/03/2014		Closed	ANTENNAS
7392		06/03/2014		Closed	ANTENNAS & FIBER CABLE
7169		03/14/2013		Closed	SEE PERMIT
7043		06/20/2012		Closed	ELECTRICAL
6932		08/30/2011		Closed	SEE PERMIT
6565		04/08/2009		Closed	SEE PERMIT
6547		02/25/2009		Closed	INSTALL ANTENNAS, EQUIP SHED, GENERATOR
6110		10/24/2006		Closed	CELL TOWER

Information Published With Permission From The Assessor

Google Maps

237 Godfrey Rd E

CT11121C



Map data ©2019 Google 200 ft

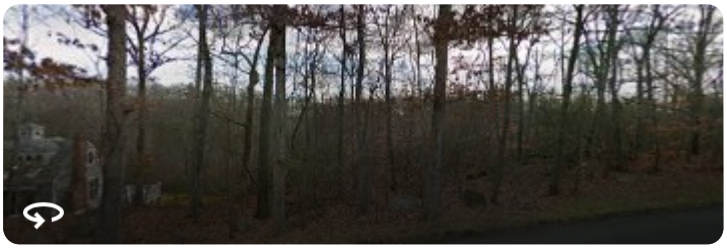
237 Godfrey Rd E

Weston, CT 06883

Directions Save Nearby Send to your phone Share

6JWM+HQ Weston, Connecticut

Photos



At this location

Weston Transfer Station
5.0 ★★★★★ (1)
City government office · 237 Godfrey Rd E
Open until 3:45 PM

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

October 2, 2006

Karina Fournier
Zoning Dept.
T-Mobile
30 Cold Spring Road
Rocky Hill, CT 06067

RE: **TS-T-MOBILE-157-060907** - Omnipoint Communications, Inc. request for an order to approve tower sharing at an existing telecommunications facility located at 237 Godfrey Road, Weston, Connecticut.

Dear Ms. Fournier:

At a public meeting held September 28, 2006, the Connecticut Siting Council (Council) ruled that the shared use of this existing tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Any additional change to this facility may require an explicit request to this agency pursuant to General Statutes § 16-50aa or notice pursuant to Regulations of Connecticut State Agencies Section 16-50j-73, as applicable. Such request or notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

This decision applies only to this request for tower sharing and is not applicable to any other request or construction. Please be advised that the validity of this action shall expire one year from the date of this letter.

The proposed shared use is to be implemented as specified in your letter dated September 7, 2006, including the placement of all necessary equipment and shelters within the tower compound.

Thank you for your attention and cooperation.

Very truly yours,

Daniel F. Caruso
Chairman

DFC/MP/laf

c: The Honorable Woody Bliss, First Selectman, Town of Weston
Robert P. Turner, Zoning Enforcement Officer, Town of Weston
Thomas J. Regan, Esq., Brown Rudnick Berlack Israels, LLP

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

CT121/WESTON TRANSFER_FT
SITE ID: CT11121C
237 GODFREY ROAD EAST
WESTON, CT 06883

T-MOBILE RF CONFIGURATION

67D92DB_2xAIR+1OP

PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   - A. REMOVE (6) EXISTING ANTENNAS, TYP. (2) PER SECTOR
   - B. INSTALL (3) NEW AIR 32 ANTENNAS, TYP. (1) PER SECTOR
   - C. INSTALL (3) NEW APXVAARR24 ANTENNAS, TYP. (1) PER SECTOR
   - D. REMOVE (3) EXISTING RADIO REMOTE UNITS, TYP. (1) PER SECTOR
   - E. INSTALL (3) NEW RADIO REMOTE UNITS, TYP. (1) PER SECTOR
   - F. REMOVE (3) EXISTING COAX CABLES
   - G. INSTALL (3) NEW 6X12 HYBRID CABLES
   - H. UPGRADE TO 125 AMP BREAKER
   - I. REPLACE (1) DUS41 AND (1) XMU WITH (1) BB6630
   - J. INSTALL (1) ADDITIONAL BB6630 FOR FUTURE 5G (N600 DARK)

PROJECT INFORMATION

SITE NAME:	CT121/WESTON TRANSFER_FT
SITE ID:	CT11121C
SITE ADDRESS:	237 GODFREY ROAD EAST WESTON, CT 06883
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592-8291
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-14'-31.18" N LONGITUDE: 73°-21'-51.53" W GROUND ELEVATION: 430'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, 2017 NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

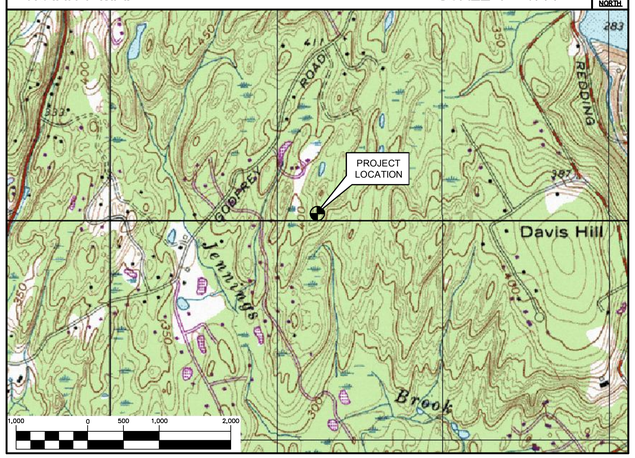
SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002 **TO:** 237 GODFREY ROAD EAST, WESTON, CT 06883

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	0.21 MI.
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	0.14 MI.
3.	TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT-187.	1.89 MI.
4.	TURN LEFT ONTO CT-305/OLD WINDSOR RD.	2.32 MI.
5.	STAY STRAIGHT TO GO ONTO BLOOMFIELD AVE/CT-305.	0.01 MI.
6.	MERGE ONTO I-91 S TOWARD HARTFORD.	26.00 MI.
7.	TAKE EXIT 17 TO MERGE ONTO CT-15 S/WILBUR CROSS PKWY.	37.70 MI.
8.	TAKE EXIT 44 FOR CT-58/FAIRFIELD/REDDING.	361 FT.
9.	USE THE RIGHT LANE TO TURN ONTO CONGRESS ST.	312 FT.
10.	TURN RIGHT ONTO CT-58 N.	3.50 MI.
11.	TURN LEFT ONTO CT-136 W.	0.70 MI.
12.	TURN RIGHT ONTO OLD REDDING RD.	1.80 MI.
13.	TURN RIGHT ONTO VALLEY FORGE RD.	1.60 MI.
14.	TURN LEFT ONTO GODFREY RD E..	0.40 MI.

VICINITY MAP

SCALE: 1" = 1000'



SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN AND TOWER ELEVATION	0
C-3	ANTENNA CONFIG. & ELEVATION	0
E-1	TYPICAL ELECTRICAL DETAILS	0
S-1	TOWER REINFORCEMENT DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/17/19	KAN/JR	CAG	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT * ENGINEER * REGISTERED PROFESSIONAL

T-Mobile

Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
CT121/WESTON TRANSFER_FT
SITE ID: CT11121C
237 GODFREY ROAD EAST
WESTON, CT 06883

DATE: 04/20/19
SCALE: AS NOTED
JOB NO. 19027.11

TITLE SHEET

T-1

Sheet No. 1 of 7

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 90-110 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10) PER 2015 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/17/19	KANJR	CAG	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

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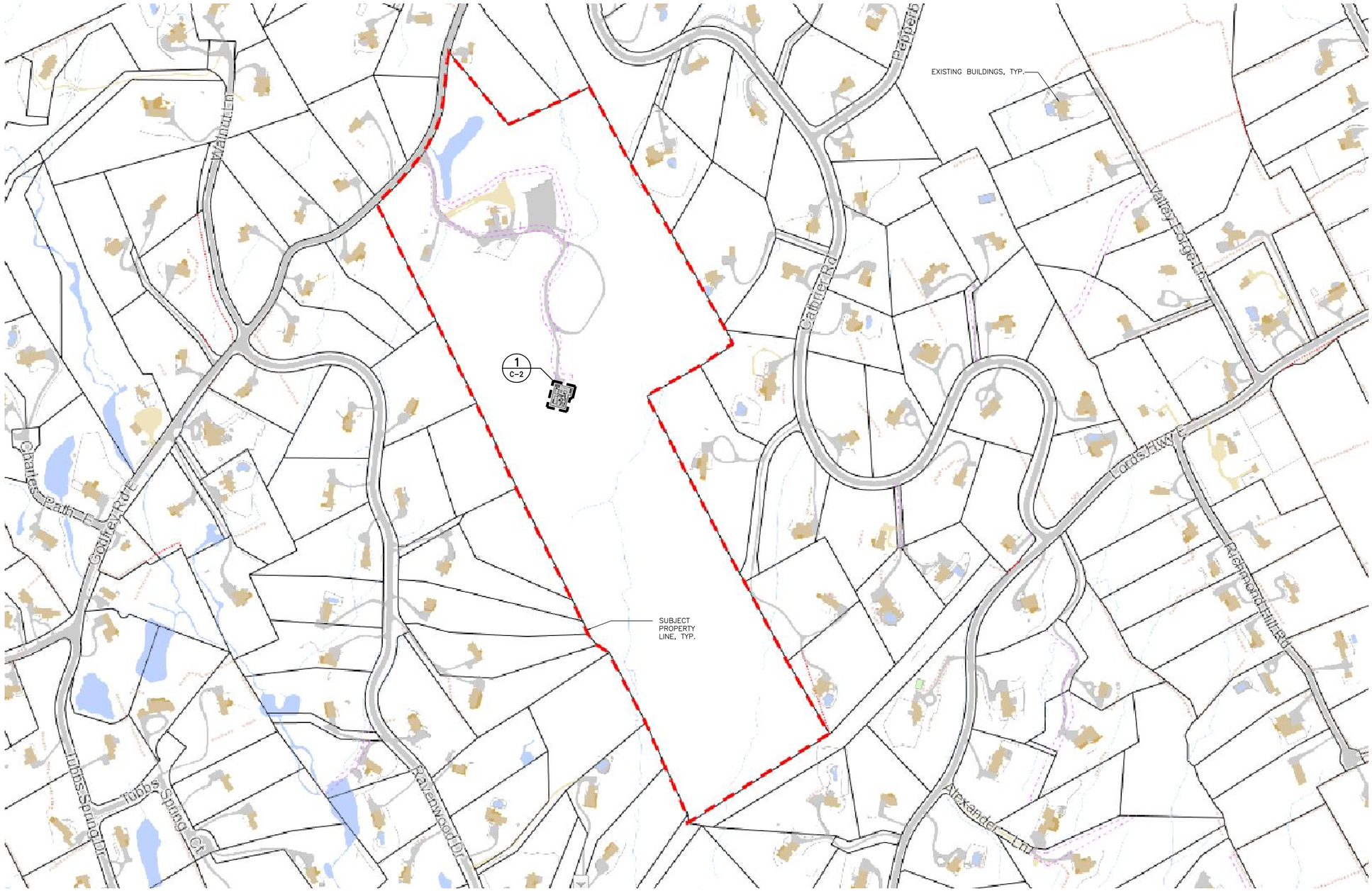
DESIGN BASIS AND SITE NOTES

N-1



1 / C-1 **SITE LOCATION PLAN**
SCALE: 1" = 200'

APPROX. NORTH

GRAPHIC SCALE
200 0 100 200 400 800
(IN FEET)
1 inch = 200 ft.

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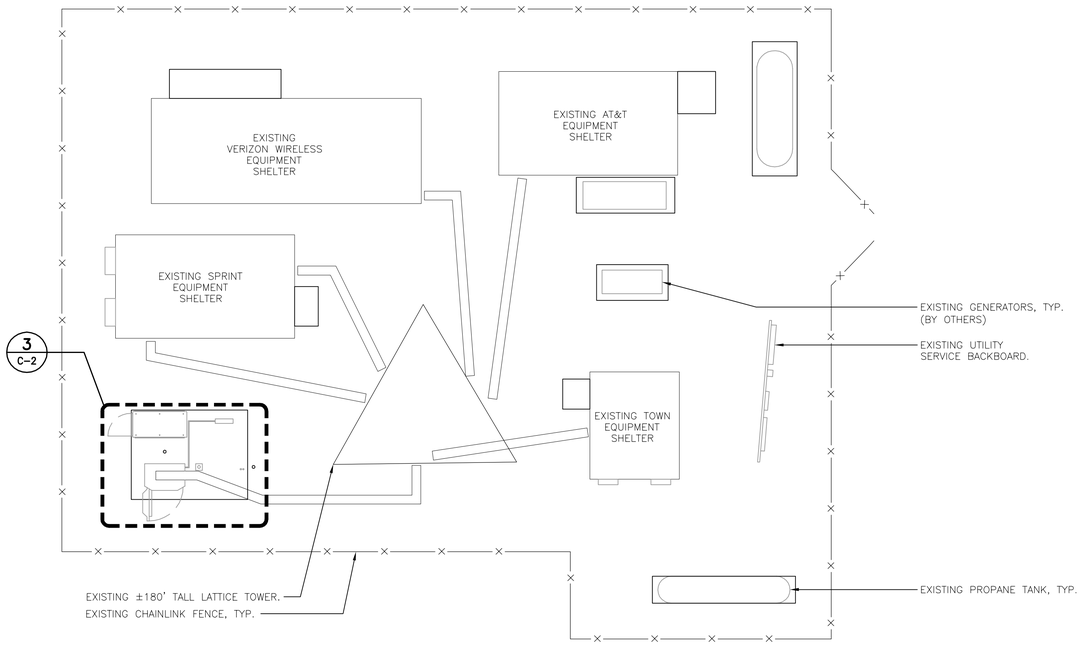
SITE LOCATION PLAN

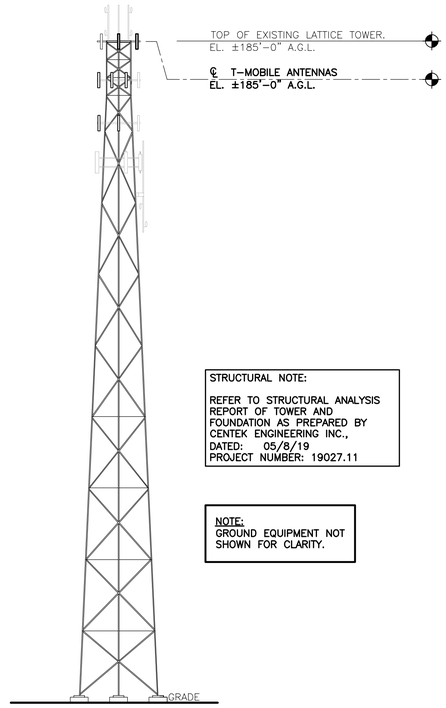
C-1

Sheet No. 3 of 7



1 C-2 **COMPOUND PLAN - PROPOSED**
SCALE: 1/8" =1'

TRUE NORTH



STRUCTURAL NOTE:

REFER TO STRUCTURAL ANALYSIS REPORT OF TOWER AND FOUNDATION AS PREPARED BY CENTEK ENGINEERING INC.,
DATED: 05/8/19
PROJECT NUMBER: 19027.11

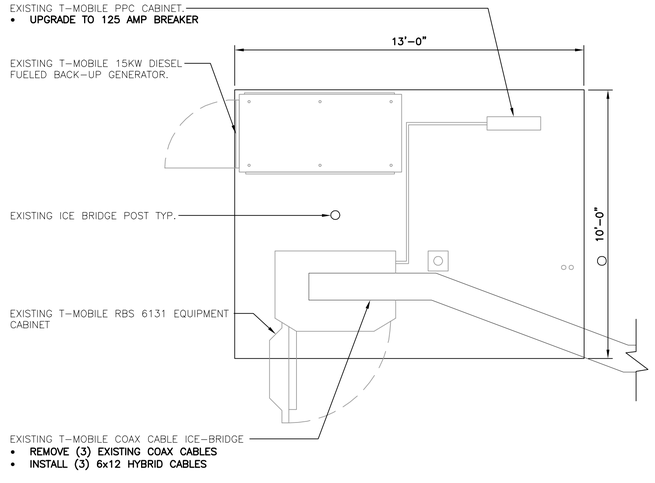
NOTE:
GROUND EQUIPMENT NOT SHOWN FOR CLARITY.

2 C-2 **TOWER ELEVATION - PROPOSED**
SCALE: 1" = 20'

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

T-MOBILE RAN TEMPLATE: 67D92DB OUTDOOR

T-MOBILE RF CONFIGURATION: 67D92DB_2xAIR+1OP



3 C-2 **EQUIPMENT PLAN - PROPOSED**
SCALE: 3/8" = 1'

TRUE NORTH

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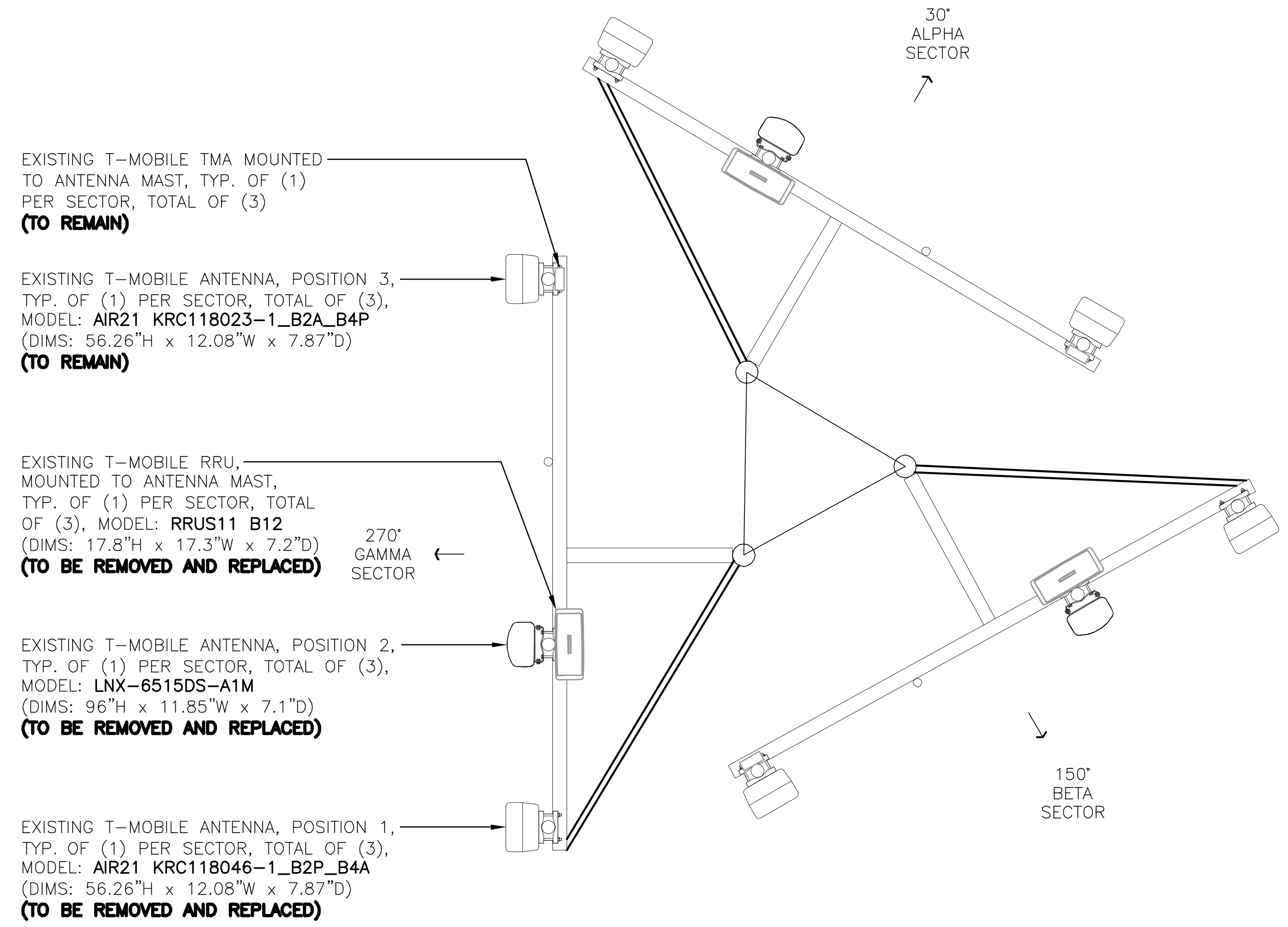
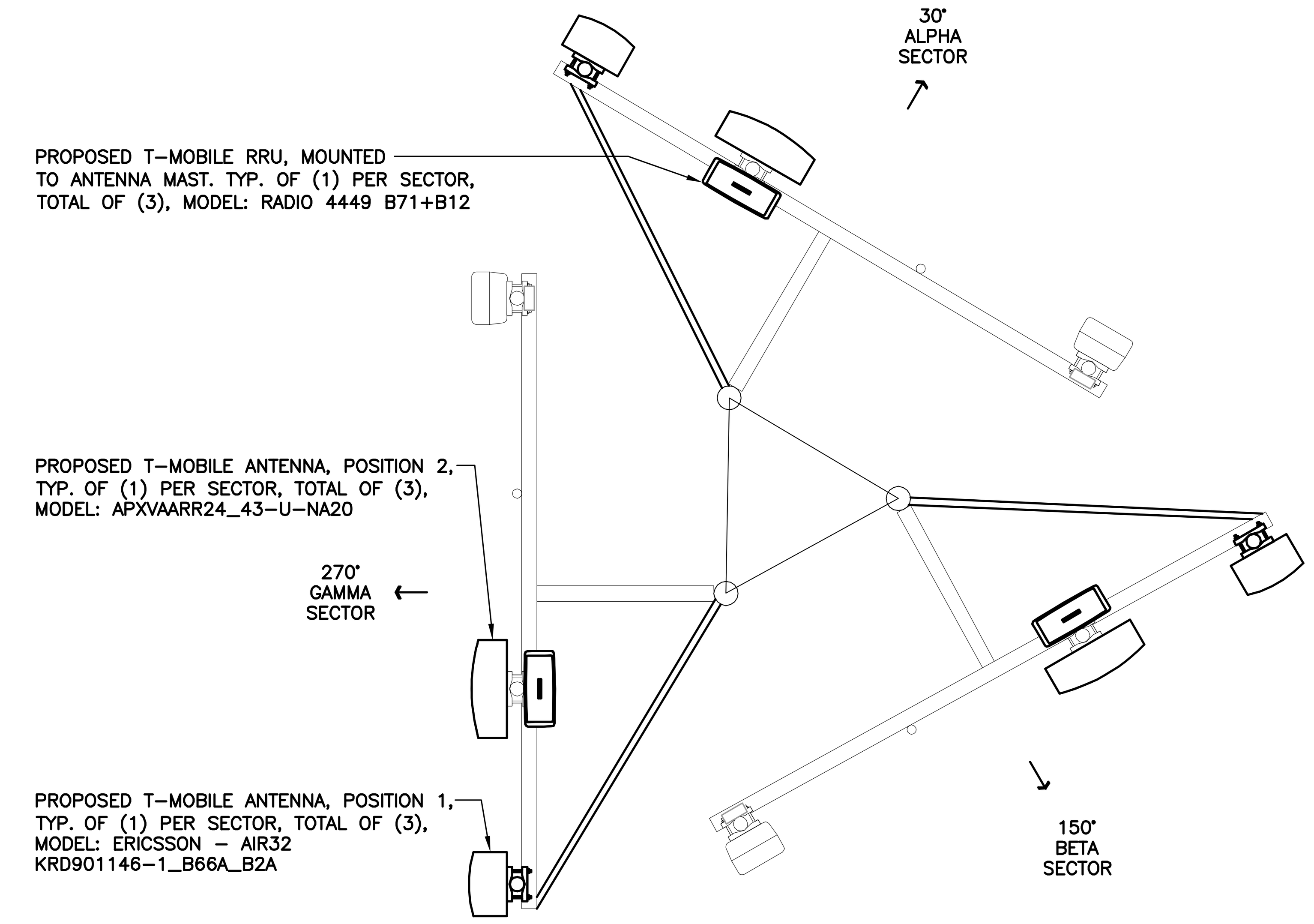
COMPOUND PLAN & TOWER ELEVATION

C-2

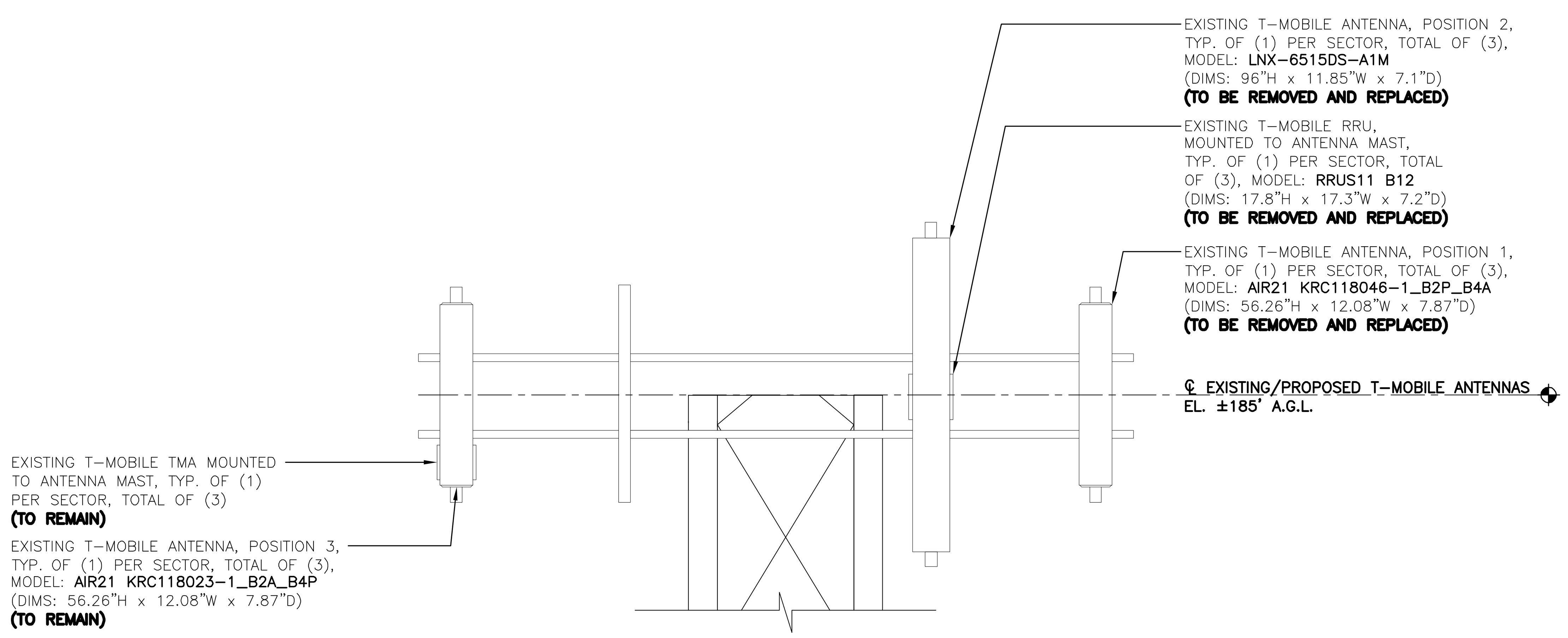
Sheet No. 4 of 7



1 C–3 **EXISTING ANTENNA MOUNTING CONFIGURATION** 185' ELEVATION
SCALE: 3/8" = 1'
TRUE NORTH

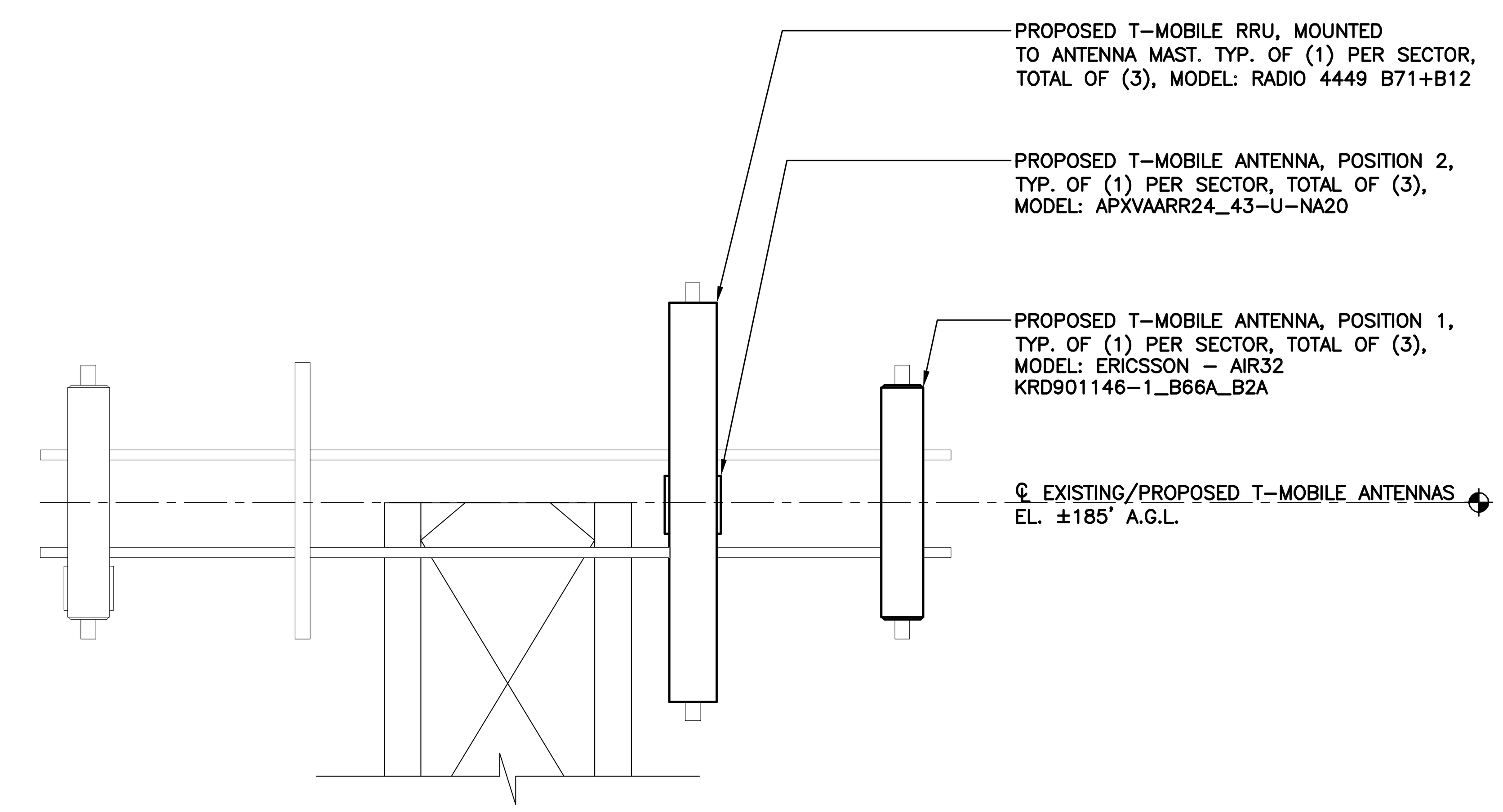


2 C–3 **PROPOSED ANTENNA MOUNTING CONFIGURATION** 185' ELEVATION
SCALE: 3/8" = 1'
TRUE NORTH



TYPICAL SECTOR

3 C–3 **ANTENNA ELEVATION – EXISTING**
SCALE: NONE



TYPICAL SECTOR

4 C–3 **ANTENNA ELEVATION – PROPOSED**
SCALE: NONE

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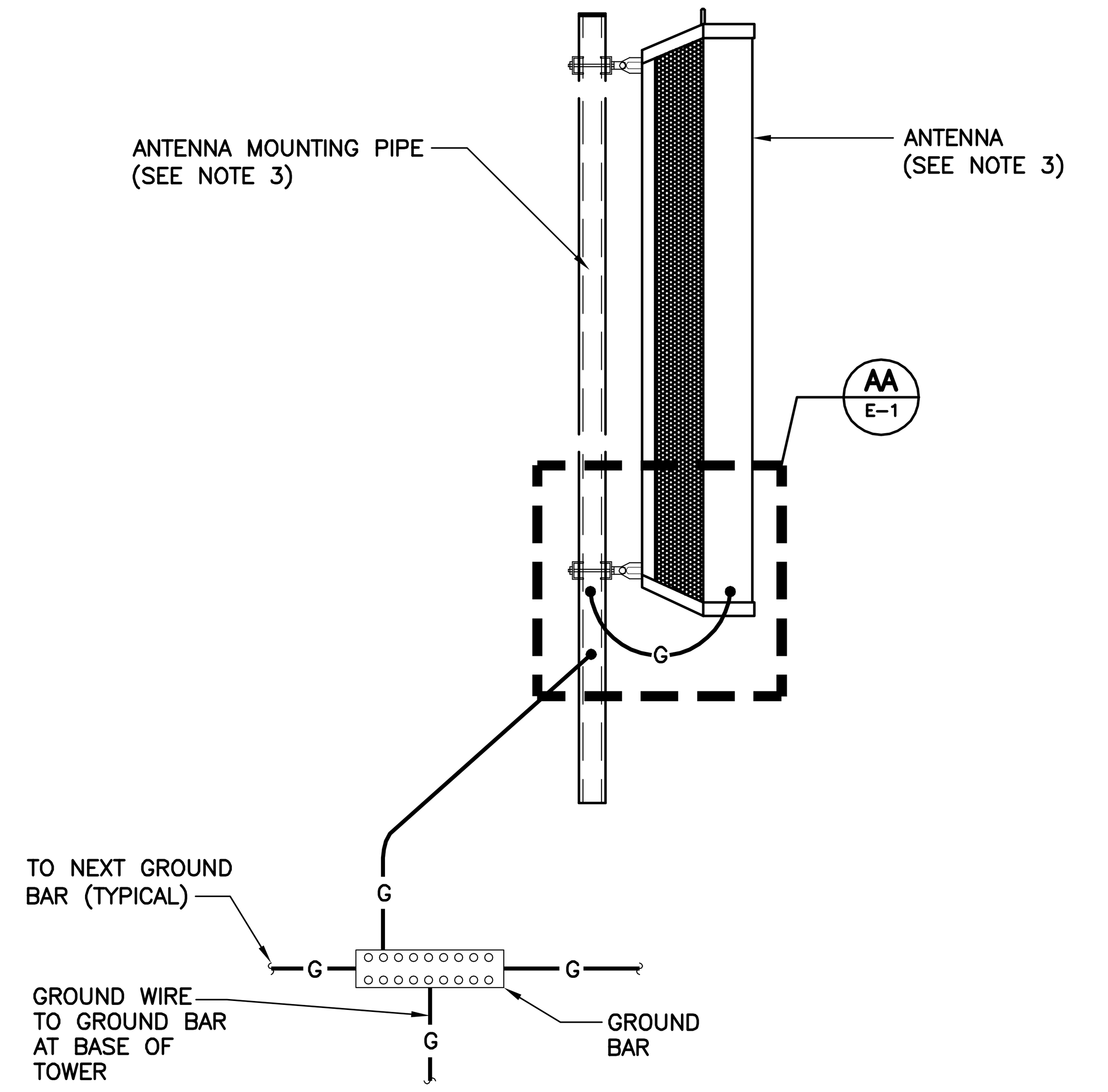
ANTENNA CONFIG. & ELEVATION

C–3

Sheet No. 5 of 7

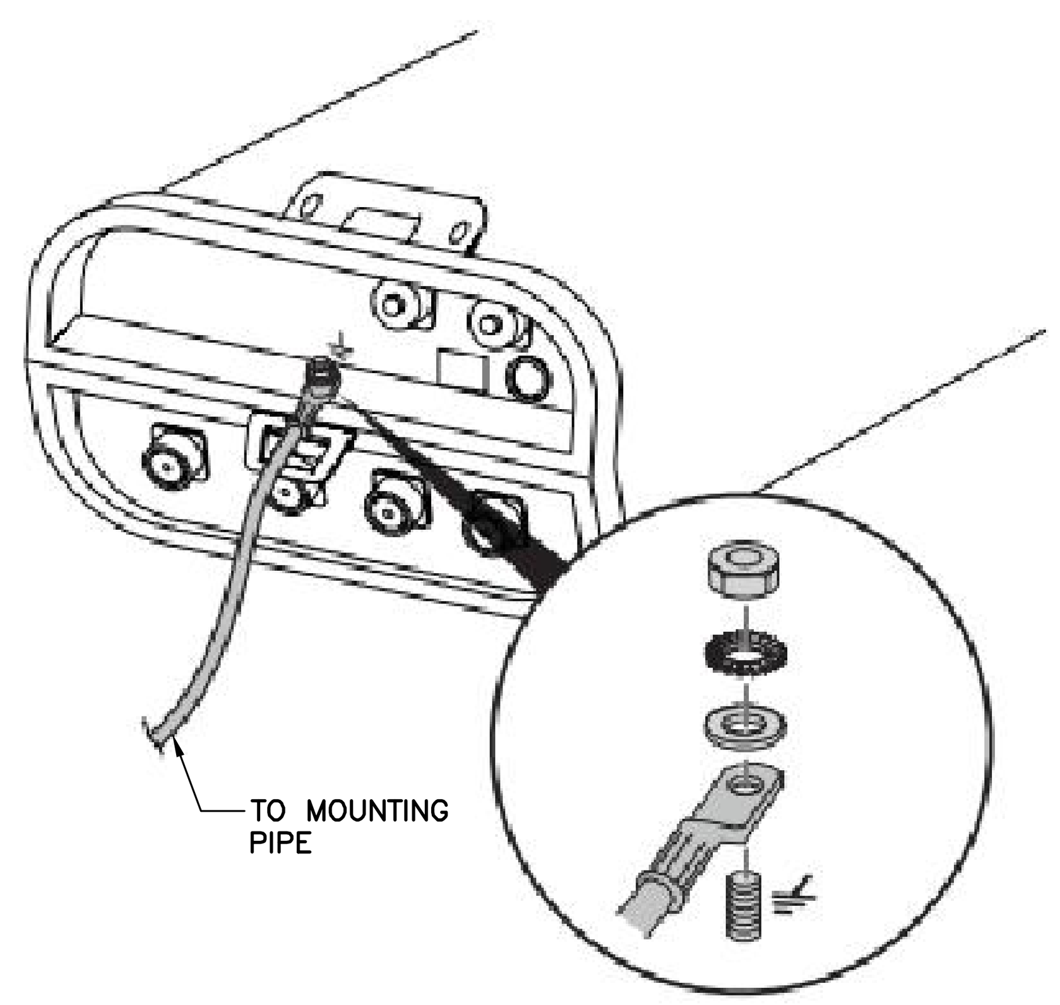


NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

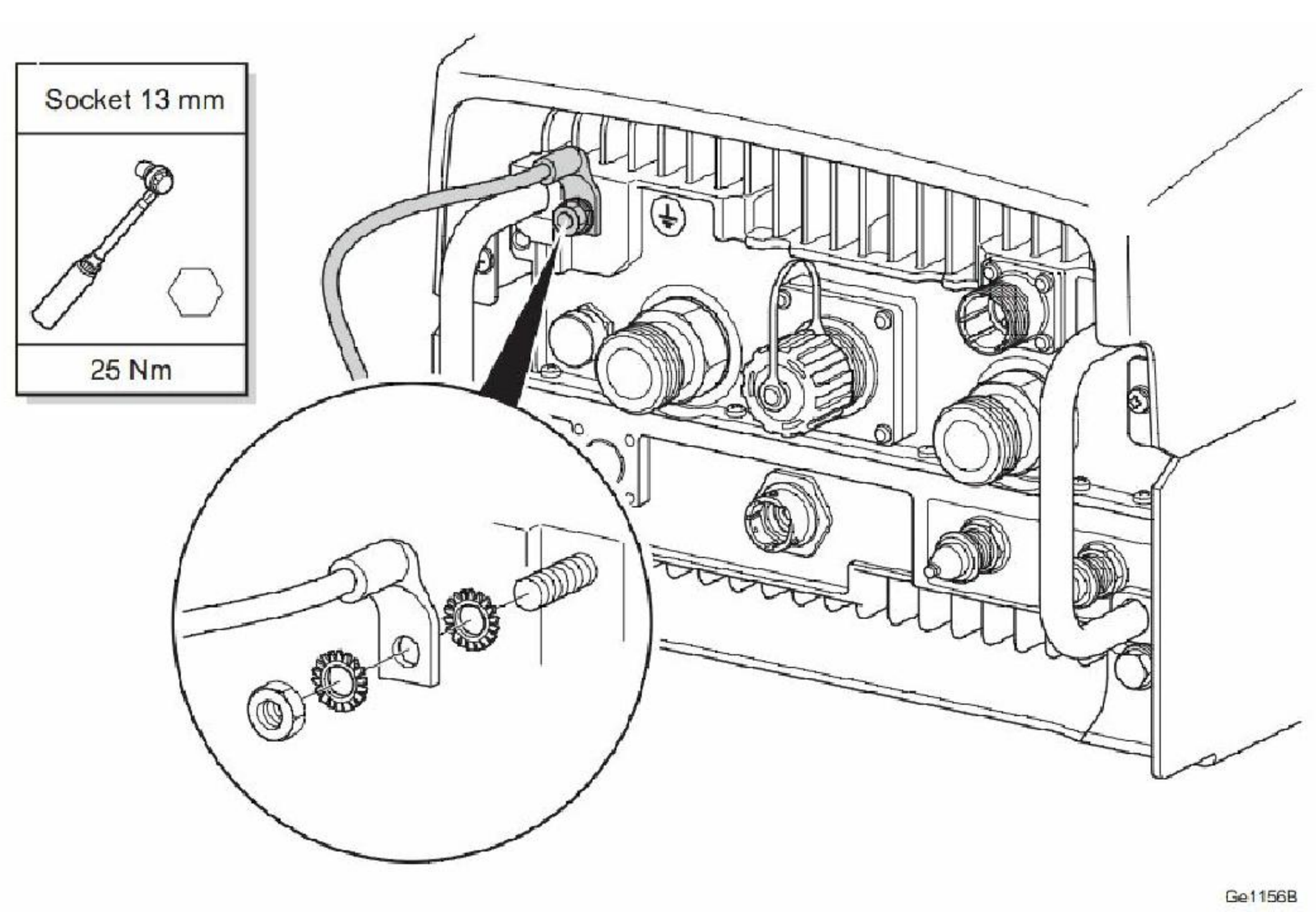
1 (E-1) TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NONE



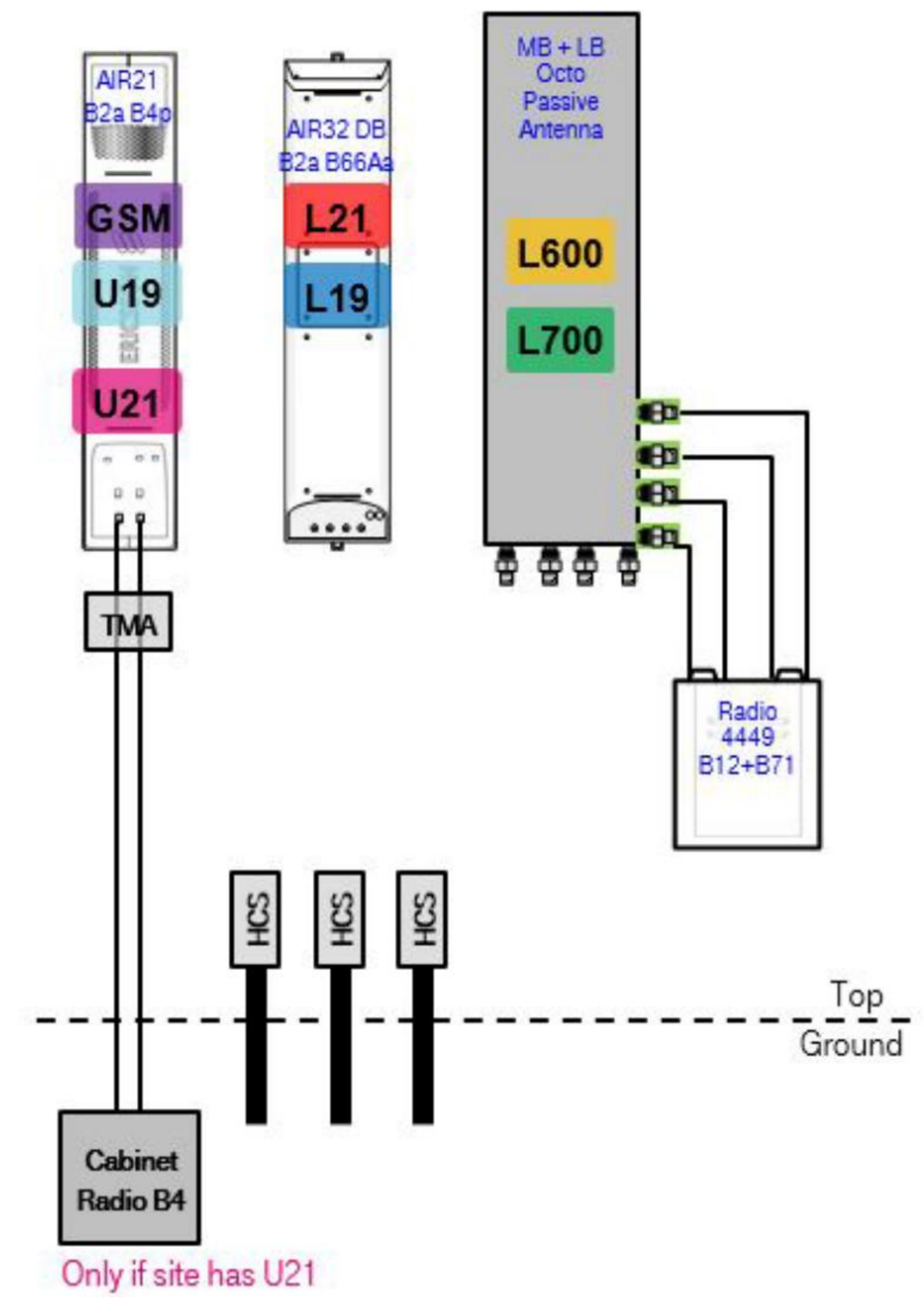
AA (E-1) TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NONE



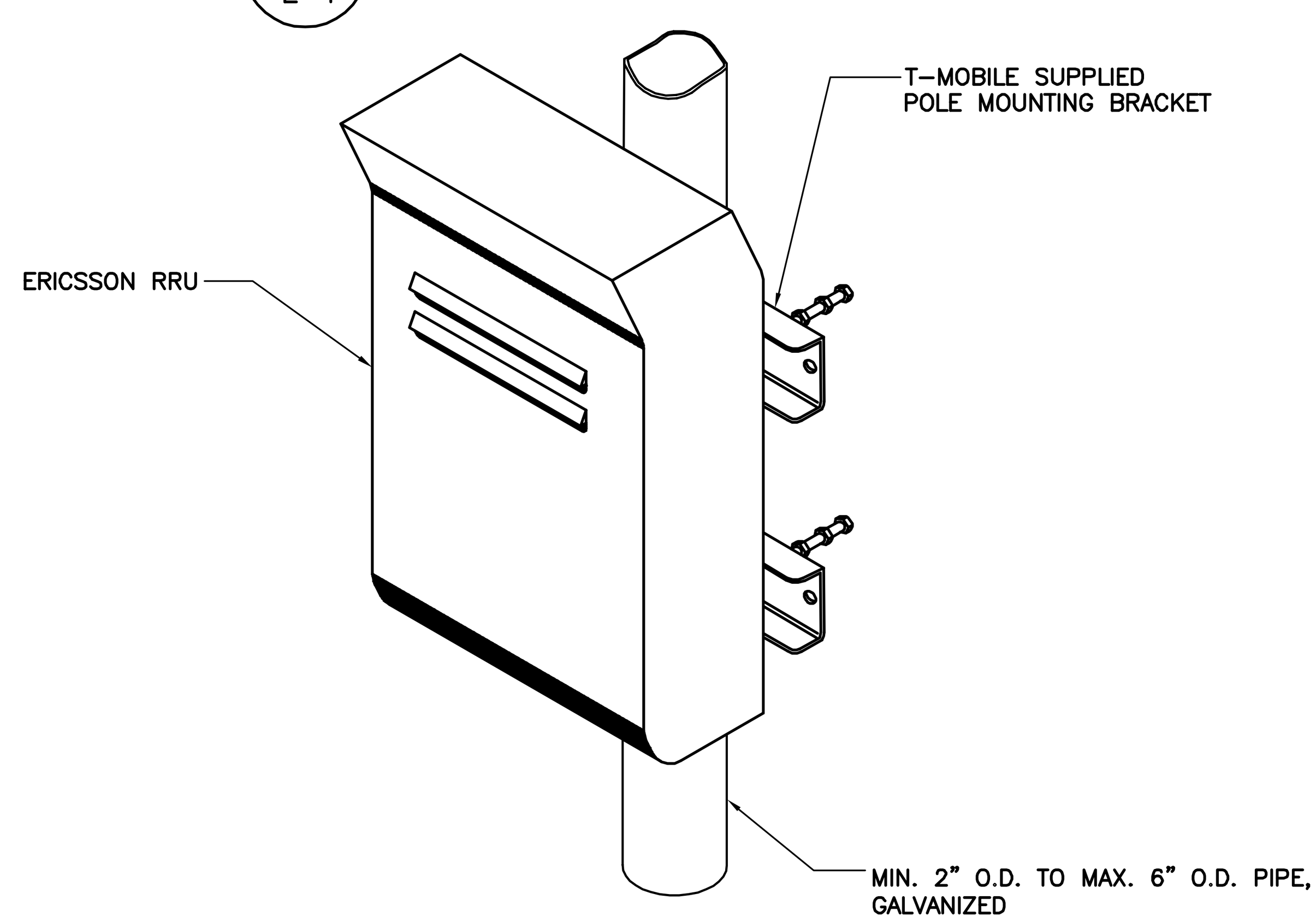
2 (E-1) TYPICAL RRU GROUNDING DETAIL

NOT TO SCALE



3 (E-1) PROPOSED PLUMBING DIAGRAM

SCALE: NONE



ISOMETRIC VIEW

NOTES:

1. T-MOBILE SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

4 (E-1) TYPICAL RRUS MOUNTING DETAILS

SCALE: NOT TO SCALE

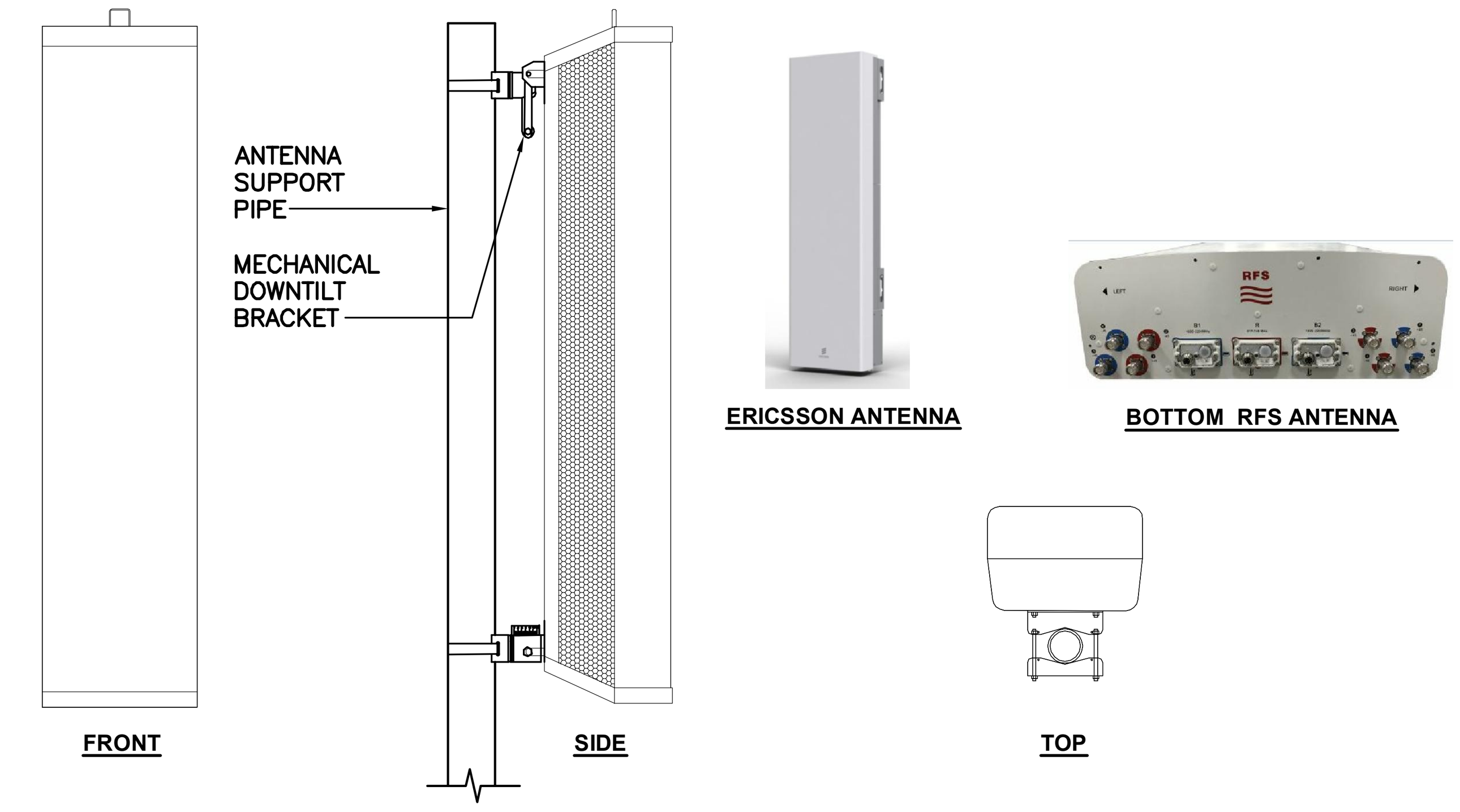
ISOMETRIC VIEW

RRU (REMOTE RADIO UNIT)				
EQUIPMENT		DIMENSIONS	WEIGHT	CLEARANCES
MAKE: MODEL:	ERICSSON RADIO 4449 B71B12	14.9"L x 13.2"W x 10.4"D	74 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

5 (E-1) PROPOSED RRU DETAIL

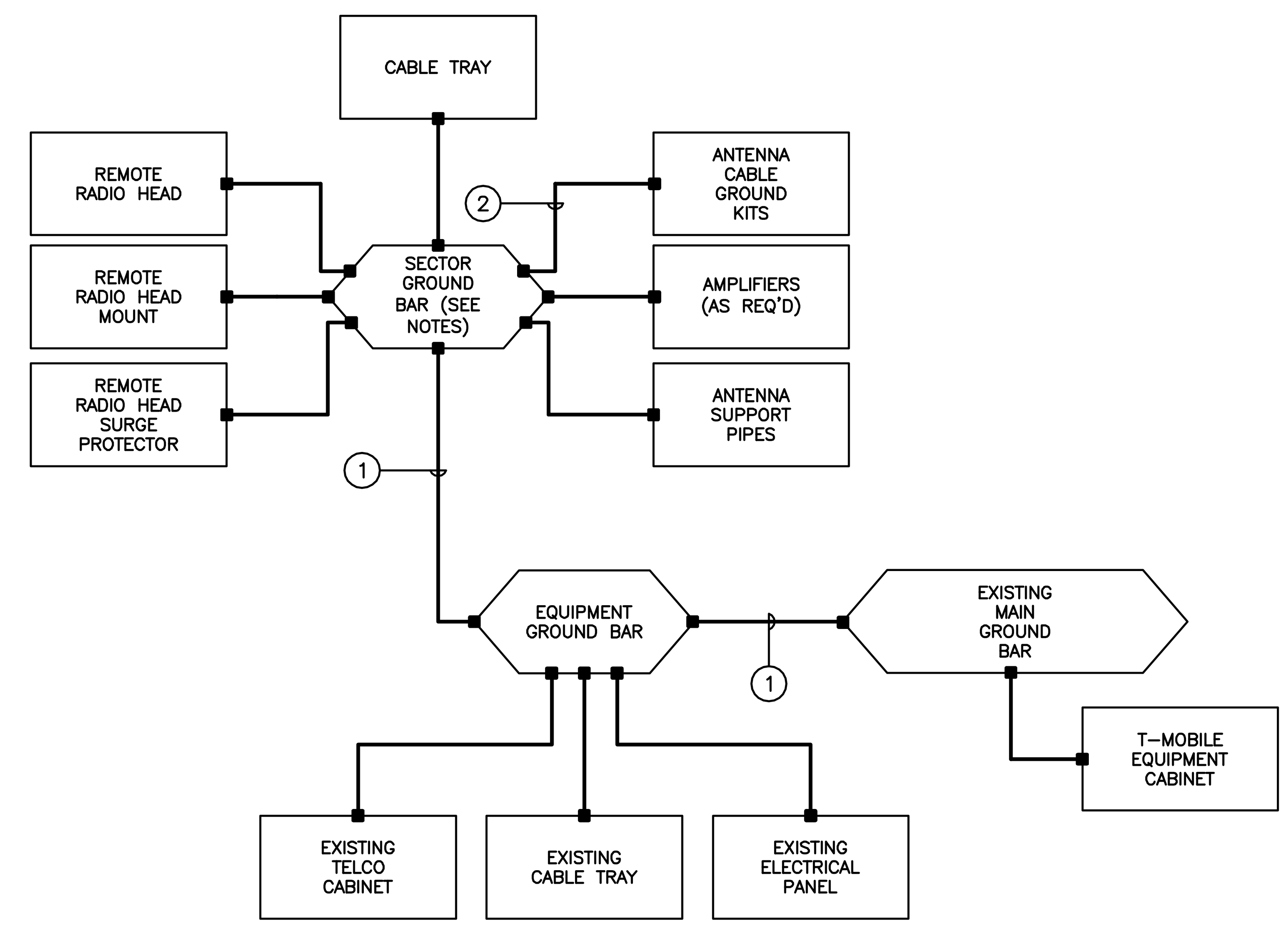
SCALE: NONE



ALPHA/BETA/GAMMA ANTENNA			
EQUIPMENT		DIMENSIONS	WEIGHT
MAKE: MODEL:	ERICSSON AIR32 KRD901146-1_B66A_B2A	56.6"L x 12.9"W x 8.7"D	132.2 LBS.
MAKE: MODEL:	RFS APXVAARR24_43-U-NA20	95.9"L x 24"W x 8.7"D	153 LBS.

6 (E-1) PROPOSED ANTENNA DETAIL

SCALE: NONE



GROUNDING SCHEMATIC NOTES

(1) #2 AWG

(2) #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW - EXTERIOR; STRANDED GREEN INSULATED - INTERIOR).
3. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
4. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
5. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
6. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
7. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

7 (E-1) TYPICAL GROUNDING SCHEMATIC DETAIL

SCALE: NOT TO SCALE

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TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 6 of 7

MODIFICATION INSPECTION REPORT REQUIREMENTS

PRE-CONSTRUCTION		DURING CONSTRUCTION		POST-CONSTRUCTION	
SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM
X	EOR MODIFICATION INSPECTION DRAWING	-	FOUNDATIONS	X	MODIFICATION INSPECTOR RECORD REDLINE DRAWING
-	EOR APPROVED SHOP DRAWINGS	-	EARTHWORK/ BACKFILL MATERIAL & COMPACTION	-	POST-INSTALLED ANCHOR ROD PULL-OUT TEST
-	EOR APPROVED POST-INSTALLED ANCHOR MPII	-	REBAR & FORMWORK GEOMETRY VERIFICATION	X	PHOTOGRAPHS
-	FABRICATION INSPECTION	-	CONCRETE TESTING		
-	FABRICATOR CERTIFIED WELDER INSPECTION	X	STEEL INSPECTION		
X	MATERIAL CERTIFICATIONS	-	POST INSTALLED ANCHOR ROD VERIFICATION		
		-	BASE PLATE GROUT VERIFICATION		
		-	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON-SITE COLD GALVANIZING VERIFICATION		
		X	CONTRACTOR AS-BUILT REDLINE DRAWINGS		

NOTES:
1. REFER TO MODIFICATION INSPECTION NOTES FOR ADDITIONAL REQUIREMENTS
2. "X" DENOTES DOCUMENT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
3. "-" DENOTES DOCUMENT NOT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
4. EOR - ENGINEER OF RECORD
5. MPII - "MANUFACTURER'S PRINTED INSTALLATION GUIDELINES"

GENERAL

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF STRUCTURAL MODIFICATIONS, TO INCLUDE A REVIEW AND COMPILATION OF SPECIFIED SUBMITTALS AND CONSTRUCTION INSPECTIONS, AS AN ASSURANCE OF COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS PREPARED UNDER THE DIRECTION OF THE ENGINEER OF RECORD (EOR).
2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND GENERAL WORKMANSHIP AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. OWNERSHIP OF THE MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD.
3. TO ENSURE COMPLIANCE WITH THE MODIFICATION INSPECTION REQUIREMENTS THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR (MI) COMMENCE COMMUNICATION UPON AUTHORIZATION TO PROCEED BY THE CLIENT. EACH PARTY SHALL BE PROACTIVE IN CONTACTING THE OTHER. THE EOR SHALL BE CONTACTED IF SPECIFIC GC/MI CONTACT INFORMATION IS NOT MADE AVAILABLE.
4. THE GC SHALL PROVIDE THE MI WITH A MINIMUM OF 5 BUSINESS DAYS NOTICE OF IMPENDING INSPECTIONS.
5. WHEN POSSIBLE, THE GC AND MI SHALL BE ON SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY NOTED DEFICIENCIES ADDRESSED DURING THE INITIAL MODIFICATION INSPECTION.

MODIFICATION INSPECTOR (MI)

1. THE MI SHALL CONTACT THE GC UPON AUTHORIZATION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE GC IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.
2. THE MI IS RESPONSIBLE FOR COLLECTION OF ALL INSPECTION AND TEST REPORTS, REVIEWING REPORTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING ON–SITE INSPECTIONS AND COMPILATION & SUBMISSION OF THE MODIFICATION INSPECTION REPORT TO THE CLIENT AND THE EOR.

GENERAL CONTRACTOR (GC)

1. THE GC IS REQUIRED TO CONTACT THE GC UPON AUTHORIZATION TO PROCEED WITH CONSTRUCTION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE MI IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.
2. THE GC IS RESPONSIBLE FOR COORDINATING AND SCHEDULING IN ADVANCE ALL REQUIRED INSPECTIONS AND TESTS WITH THE MI.

CORRECTION OF FAILING MODIFICATION INSPECTION

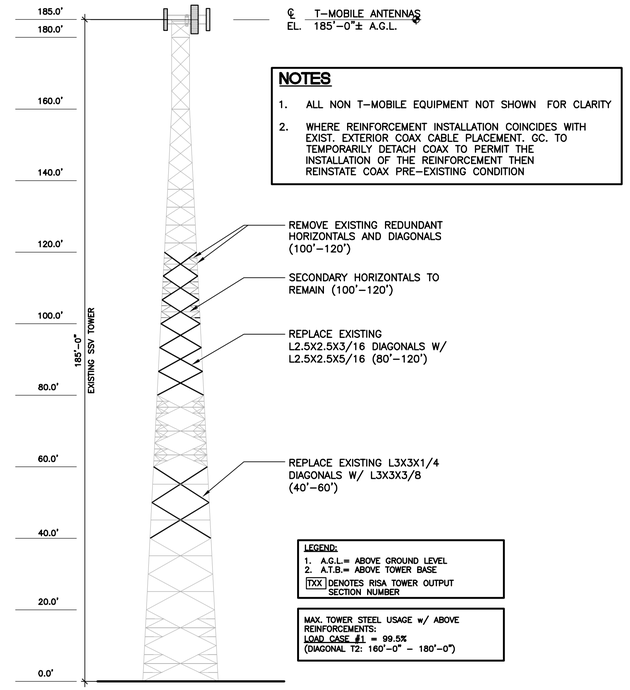
1. SHOULD THE STRUCTURAL MODIFICATION NOT COMPLY WITH THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS, THE GC SHALL WORK WITH THE MODIFICATION INSPECTOR IN A VIABLE REMEDIATION PLAN AS FOLLOWS:

   – CORRECT ALL DEFICIENCIES TO COMPLY WITH THE CONTRACT DOCUMENTS AND COORDINATE WITH THE MI FOR A FOLLOW UP INSPECTION.
   – WITH CLIENT AUTHORIZATION, THE GC MAY WORK WITH THE EOR TO REANALYZE THE MODIFICATION USING THE AS–BUILT CONDITION.

REQUIRED PHOTOGRAPHS

1. THE GC AND MI SHALL AT MINIMUM PHOTO DOCUMENT THE FOLLOWING FOR INCLUSION IN THE MODIFICATION INSPECTION REPORT:

   – PRE–CONSTRUCTION: GENERAL CONDITION OF THE SITE.
   – DURING CONSTRUCTION: RAW MATERIALS, CRITICAL DETAILS, WELD PREPARATION, BOLT INSTALLATION & TORQUE, FINAL INSTALLED CONDITION & SURFACE COATING REPAIRS.
   – POST–CONSTRUCTION: FINAL CONDITION OF THE SITE



1 / S–1 **TOWER ELEVATION – PROPOSED**
SCALE: 1" = 20'–0"

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TOWER REINFORCEMENT DETAILS

S–1

Sheet No. 7 of 7

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report and Reinforcement Design

185-ft Existing Sabre Lattice Tower

Proposed T-Mobile
Antenna Upgrade (L600)

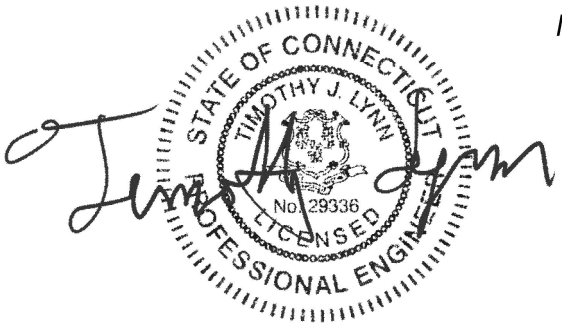
T-Mobile Site Ref: CT11121C

237 Godfrey Road
Weston, CT

CENTEK Project No. 19027.11

~~*Date: April 30, 2019*~~
Rev 2: May 21, 2019

Max Stress Ratio = 99.5%



Prepared for:

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Bloomfield, CT 06002

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T a b l e o f C o n t e n t s

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna modification proposed by the T-Mobile on the existing lattice tower located in Weston, Connecticut.

The host tower is a 185-ft, three legged, tapered steel lattice tower originally designed and manufactured by Sabre. The manufacturer's drawings and calculations were unavailable for use in this report. The tower geometry and structure member sizes were taken from a previous structural analysis prepared by Centek project no. 14001.10 dated April 9, 2014.

Antenna and appurtenance information were obtained from the aforementioned structural analysis report, a structural analysis report prepared by Hudson Design Group for AT&T dated October 24, 2018 and information provided by T-Mobile.

The tower consists of ten (10) tapered vertical sections consisting of structural steel pipe legs conforming to ASTM A572 Gr. 50. Diagonal lateral support bracing consists of structural steel angle shapes conforming to ASTM A36. The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by welded and bolted gusset connections. The width of the tower face is 5.00-ft at the top and 21.00-ft at the base.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- MUNICIPAL (EXISTING):
  Antenna: One (1) 10-ft ∅ Omni-directional (whip) antenna and two (2) 10-ft dipoles leg mounted to the top of the tower.
  Coax Cable: Three (3) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- SPRINT (EXISTING):
  Antennas: Three (3) RFS APXVSPP18-C-A20 panel antennas, three (3) RFS APXVTM14 panel antennas, three (3) ALU 1900 MHz RRHs, three (3) ALU 800 MHz RRHs and three (3) 2500 MHz RRHs mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±174-ft above the existing tower base.
  Coax Cables: Four (4) 1-1/4" ∅ Hybriflex cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- VERIZON (EXISTING):
  Antennas: Three (3) Antel BXA-70063-6CF panel antennas, four (4) Decibel DB846F65ZAXY panel antennas, two (2) Decibel DB846H80E-SX panel antennas, six (6) Kathrein 742-213 panel antennas, three (3) Alcatel-Lucent RRH2x40-AWS Remote Radio Heads and one (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±164-ft above the existing tower base.
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables and one (1) 1-5/8" ∅ fiber cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- AT&T (EXISTING):
  Antenna: Three (3) Powerwave 7770 panel antennas, three (3) CCI HPA65R-BU6A panel antennas, three (3) Powerwave P65-16-XLH-RR panel antennas, six (6) Powerwave LGP21401 TMAs, three (3) Ericsson RRUS-11 remote radio heads, three (3) Ericsson 4415 B25 remote radio heads and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on three (3) existing 12-ft T-Frames with a RAD center elevation of ±151-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables, one (1) fiber cable and two (2) dc control cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- MUNICIPAL (EXISTING):
  Antenna: Two (2) 7-ft ∅ Omni-directional (whip) antennas and two (2) 10-ft dipoles mounted on two (2) 6-ft side arms with an elevation of ±145-ft above the existing tower base.
  Coax Cable: Four (4) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- T-MOBILE (Existing):
  Antenna: Three (3) Ericsson AIR21 panel antennas and three (3) TMAs mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±185-ft above the existing tower base.
  Coax Cable: Nine (9) 1-5/8" ∅ coax cables and one (1) 9x18 fiber cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- T-MOBILE (EXISTING TO REMOVE):
  Antenna: Three (3) Ericsson AIR21 panel antennas, three (3) Andrew LNX6515DS and three (3) RRUS-11 remote radio heads mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±185-ft above the existing tower base.
  Coax Cable: Three (3) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **T-MOBILE (PROPOSED):**
  Antennas: Three (3) RFS APXVAARR24_43 panel antennas, three (3) Ericsson AIR32 panel antennas and three (3) Ericsson 4449 B71 B12 remote radio heads mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±185-ft above the existing tower base.
  Coax Cables: Three (3) 6x12 fiber line running on a leg/face of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.

A n a l y s i s

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

T o w e r L o a d i n g

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	Weston; v = 93 mph (3 second gust)	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 93 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; = 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses **with the reinforcements detailed in section 4 of this report were found** to be within allowable limits. Per tnxTower "Section Capacity Table", this tower was found to be at **99.5%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T10)	0'-0"- 20'-0"	86.1%	**PASS**
Diagonal (T2)	160'-0"- 180'-0"	99.5%	**PASS**

Foundation and Anchors

The existing foundation consists of three (3) 3.5-ft ∅ x 5-ft long reinforced concrete piers on a 30.5-ft square x 1.5-ft thick reinforced concrete pad. The foundation information was taken from the aforementioned Centek structural analysis. The tower legs are connected to the three (3) reinforced concrete piers by means of six (6) 1-1/2" ∅ ASTM A449 anchor bolts per leg embedded into the concrete foundation structure.

- The tower reactions developed from the governing Load Case of the were used in the verification of the foundation and anchor bolts:

Leg Reactions	Vector	Proposed Tower Reactions
Leg	Shear	**36 kips**
	Compression	**333 kips**
	Uplift	**288 kips**
Base	Shear	**55 kips**
	Compression	**56 kips**
	Moment	**5716 kip-ft**

- The anchor bolts were found to be within allowable limits.

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	44.6%	**PASS**

- The foundation was found to be within allowable limits.

Foundation Type	Design Limit	Allowable Limit/FS	Proposed Loading	Result
Reinforced Concrete Pad and Piers	Ultimate Bearing Pressure	12.00 ksf	2.29 ksf	**PASS**
	Rock Mass Uplift Resistance	1.00 (1)	1.76	**PASS**

Note 1: Minimum required Factor of Safety (FS) of 1.0 required per TIA-222-G section 9.4

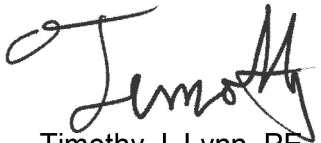
C o n c l u s i o n

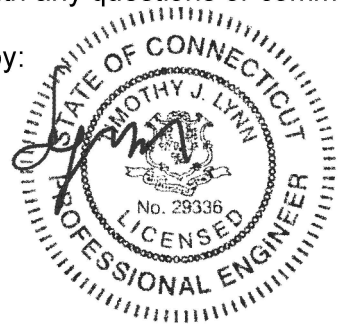
This analysis shows that the subject tower **with the reinforcements detailed in section 4 of this report is adequate** to support the proposed antenna configuration.

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:





Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

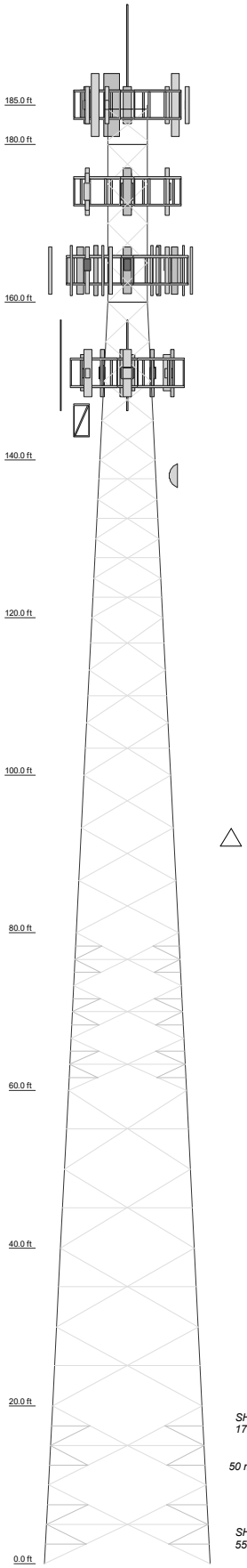
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISA Tower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	P8x.322		P5x0.5		P5x.375	P5x.258	P3.5x.318	P2.5x.375	P2.5x.203	P2x.154
Leg Grade	A572-50									
Diagonals	L3 1/2x3 1/2x1/4		L3x3x3/8	L3x3x3/16	L2 1/2x2 1/2x5/16		L2x2x3/16	L2x2x1/8		
Diagonal Grade	A36									
Top Girts				N.A.				L2x2x1/8		
Horizontals	L3 1/2x3 1/2x1/2		N.A.	L3x3x3/8	N.A.					
Sec. Horizontals	N.A.	L3x3x1/2	L3x3x7/16	N.A.		L2 1/2x2 1/2x3/8	L2x2x1/4	N.A.		
Red. Horizontals	L3x3x1/2		N.A.	L3x3x1/2	N.A.		N.A.			
Red. Diagonals	L3x3x1/2		N.A.	L3x3x1/2	N.A.		N.A.			
Face Width (ft)	21	19	17	15	13	11	9	7	5	
# Panels @ (ft)	4 @ 5	4 @ 10		6 @ 3.33333		6 @ 6.66667		12 @ 5	1 @ 4	
Weight (K)	29.1	7.0	4.1	4.0	5.7	2.5	2.5	1.6	0.9	0.1



ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 333 K
SHEAR: 36 K

UPLIFT: -288 K
SHEAR: 31 K

AXIAL 170 K
SHEAR 17 K *MOMENT 1931 kip-ft*
TORQUE 12 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 56 K
SHEAR 55 K *MOMENT 5716 kip-ft*
TORQUE 45 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
DB222	185	DB846H80E-SX (Verizon - Existing)	164
DB222	185	DB846F65ZAXY (Verizon - Existing)	164
DB636-A	185	BXA-70063/6CF (Verizon - Existing)	164
AIR21 B2A/B4P (T-Mobile - Existing)	185	DB846F65ZAXY (Verizon - Existing)	164
AIR21 B2A/B4P (T-Mobile - Existing)	185	742-213 (Verizon - Existing)	164
AIR21 B2A/B4P (T-Mobile - Existing)	185	742-213 (Verizon - Existing)	164
AIR32 (T-Mobile - Proposed)	185	742-213 (Verizon - Existing)	164
AIR32 (T-Mobile - Proposed)	185	742-213 (Verizon - Existing)	164
AIR32 (T-Mobile - Proposed)	185	742-213 (Verizon - Existing)	164
APXVAARR24-43 (T-Mobile - Proposed)	185	742-213 (Verizon - Existing)	164
APXVAARR24-43 (T-Mobile - Proposed)	185	RRH2x40-AWS (Verizon - Existing)	164
APXVAARR24-43 (T-Mobile - Proposed)	185	RRH2x40-AWS (Verizon - Existing)	164
Radio 4449 B71 B12 (T-Mobile - Proposed)	185	RRH2x40-AWS (Verizon - Existing)	164
Radio 4449 B71 B12 (T-Mobile - Proposed)	185	DB-T1-6Z-8AB-0Z (Verizon - Existing)	164
Radio 4449 B71 B12 (T-Mobile - Proposed)	185	Valmont 15' T-Frame P/N 860109 (Verizon - Existing)	164
TMA 10"x8"x3" (T-Mobile - Existing)	185		
TMA 10"x8"x3" (T-Mobile - Existing)	185	Valmont 15' T-Frame P/N 860109 (Verizon - Existing)	164
TMA 10"x8"x3" (T-Mobile - Existing)	185		
Pirod 12' T-Frame Sector Mount (1) (T-Mobile - Existing)	185	Valmont 15' T-Frame P/N 860109 (Verizon - Existing)	164
Pirod 12' T-Frame Sector Mount (1) (T-Mobile - Existing)	185	7770.00 (ATI - Existing)	151
		7770.00 (ATI - Existing)	151
Pirod 12' T-Frame Sector Mount (1) (T-Mobile - Existing)	185	7770.00 (ATI - Existing)	151
		HPA65R-BU6A (ATI - Existing)	151
APXVSPP18-C-A20 (Sprint - Existing)	174	HPA65R-BU6A (ATI - Existing)	151
APXVSPP18-C-A20 (Sprint - Existing)	174	HPA65R-BU6A (ATI - Existing)	151
APXVSPP18-C-A20 (Sprint - Existing)	174	P65-16-XLH-RR (ATI - Existing)	151
APXVTM14 (Sprint - Existing)	174	P65-16-XLH-RR (ATI - Existing)	151
APXVTM14 (Sprint - Existing)	174	P65-16-XLH-RR (ATI - Existing)	151
APXVTM14 (Sprint - Existing)	174	(2) LGP21401 TMA (ATI - Existing)	151
FD-RRH 2x50 800 (Sprint - Existing)	174	(2) LGP21401 TMA (ATI - Existing)	151
FD-RRH 2x50 800 (Sprint - Existing)	174	(2) LGP21401 TMA (ATI - Existing)	151
FD-RRH 2x50 800 (Sprint - Existing)	174	RRUS-11 (ATI - Existing)	151
FD-RRH 4x45 1900 (Sprint - Existing)	174	RRUS-11 (ATI - Existing)	151
FD-RRH 4x45 1900 (Sprint - Existing)	174	RRUS-11 (ATI - Existing)	151
FD-RRH 4x45 1900 (Sprint - Existing)	174	4415 B25 (ATI - Existing)	151
TD-RRH8x20-25 (Sprint - Existing)	174	4415 B25 (ATI - Existing)	151
TD-RRH8x20-25 (Sprint - Existing)	174	4415 B25 (ATI - Existing)	151
TD-RRH8x20-25 (Sprint - Existing)	174	DC6-48-60-18-8F Surge Arrestor (ATI - Existing)	151
Pirod 12' T-Frame Sector Mount (1) (Sprint - Existing)	174	Pirod 10' PCS Frame (1) (ATI - Existing)	151
		Pirod 10' PCS Frame (1) (ATI - Existing)	151
Pirod 12' T-Frame Sector Mount (1) (Sprint - Existing)	174	Pirod 10' PCS Frame (1) (ATI - Existing)	151
		DB222	145
Pirod 12' T-Frame Sector Mount (1) (Sprint - Existing)	174	DB222	145
		DB636-A	145
DB846F65ZAXY (Verizon - Existing)	164	DB636-A	145
BXA-70063/6CF (Verizon - Existing)	164	Pirod 6' Side Mount Standoff (1)	145
DB846F65ZAXY (Verizon - Existing)	164	Pirod 6' Side Mount Standoff (1)	145
DB846H80E-SX (Verizon - Existing)	164	3-ft dish	138
BXA-70063/6CF (Verizon - Existing)	164		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

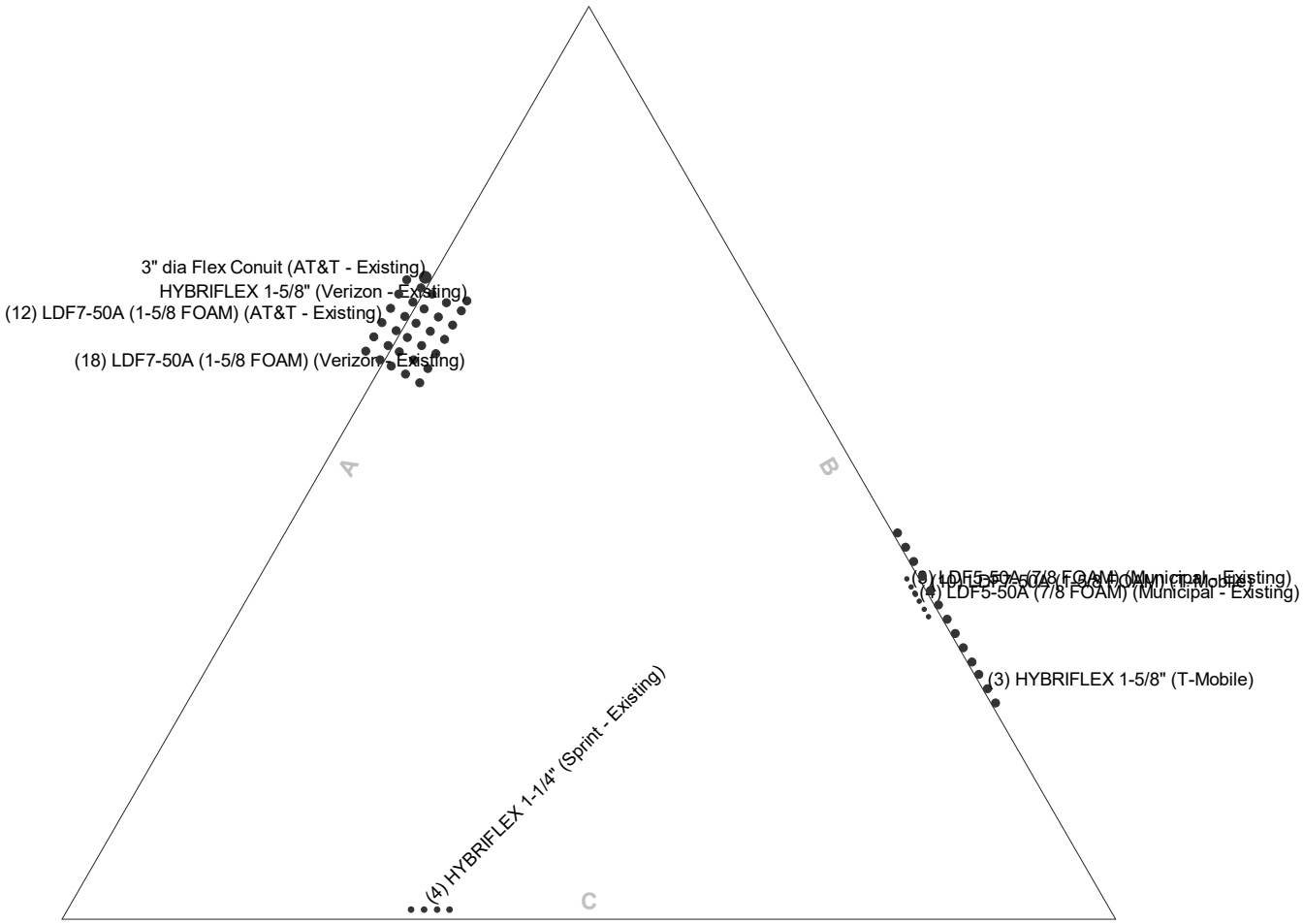
1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 99.5%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: *19027.11 - CT11121C*	
Project: *185' Lattice Tower - 237 Godfrey Road, Weston, CT*	
Client: T-Mobile	Drawn by: TJL / App'd:
Code: TIA-222-G	Date: 05/08/19 / Scale: NTS
Path:	Dwg No. E-1

Feed Line Plan

_____ Round _____ Flat _____ App In Face _____ App Out Face



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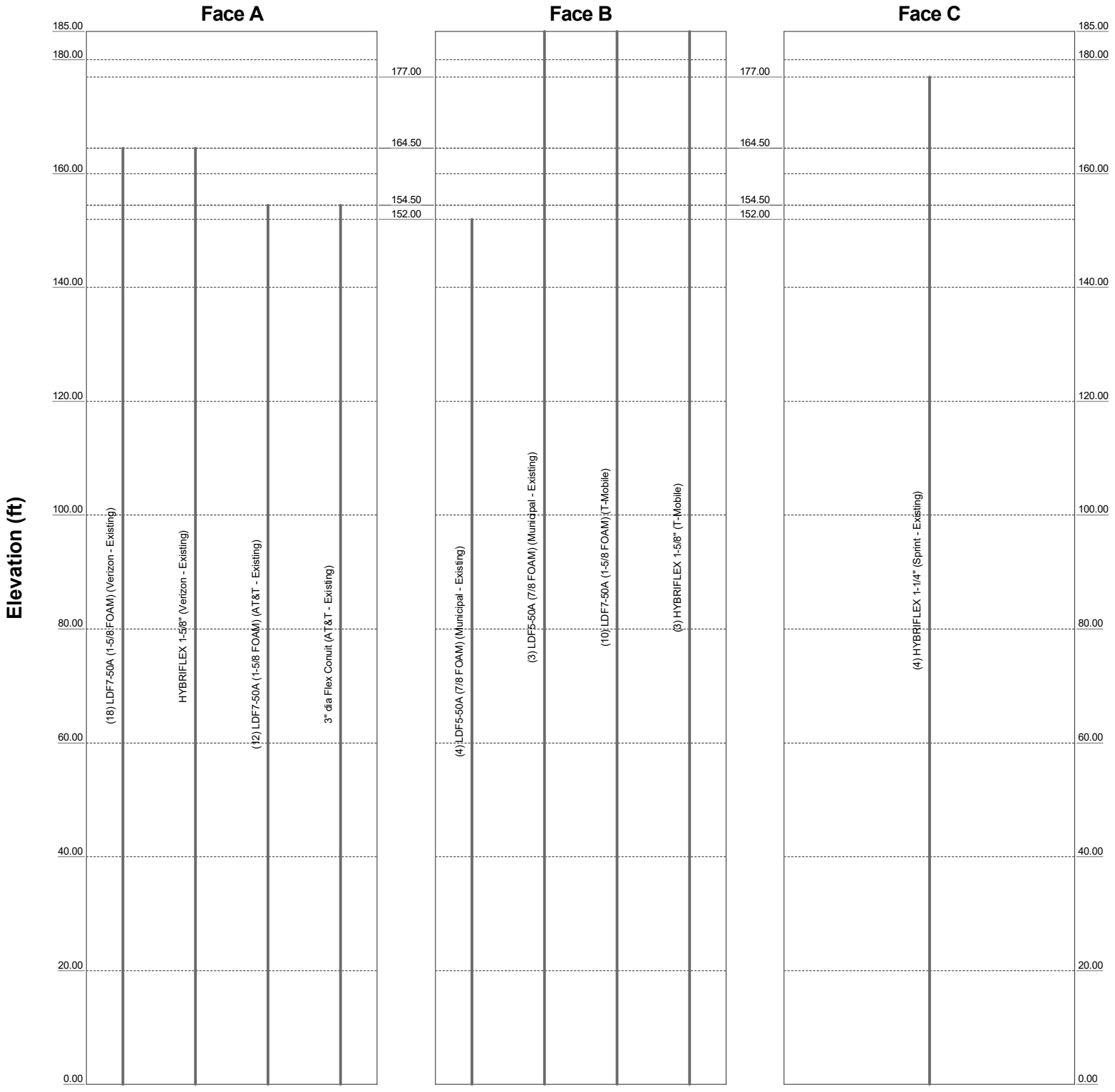
Feed Line Distribution Chart
0' - 185'

Round | Flat | App In Face | App Out Face | Truss Leg



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Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 05/08/19	Scale: NTS
Path: J:\Jobs\19027\00.WI\11_CT11121C\05_Structural\Tower Analysis\Backup Documentation\Rev (1)\ERI Files\185-ft Lattice Weston.eri		Dwg No. E-7

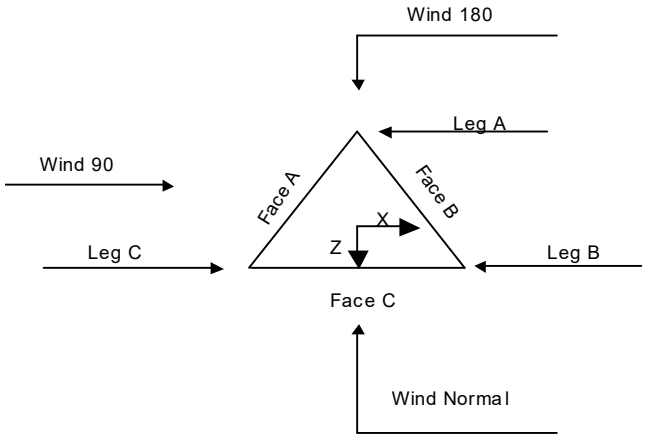
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 185.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 21.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Basic wind speed of 93 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	185.00-180.00			5.00	1	5.00
T2	180.00-160.00			5.00	1	20.00
T3	160.00-140.00			5.00	1	20.00
T4	140.00-120.00			7.00	1	20.00
T5	120.00-100.00			9.00	1	20.00
T6	100.00-80.00			11.00	1	20.00
T7	80.00-60.00			13.00	1	20.00
T8	60.00-40.00			15.00	1	20.00
T9	40.00-20.00			17.00	1	20.00
T10	20.00-0.00			19.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	185.00-180.00	4.00	X Brace	No	No	6.0000	6.0000
T2	180.00-160.00	5.00	X Brace	No	No	0.0000	0.0000
T3	160.00-140.00	5.00	X Brace	No	No	0.0000	0.0000
T4	140.00-120.00	5.00	X Brace	No	Yes	0.0000	0.0000
T5	120.00-100.00	6.67	X Brace	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	100.00-80.00	6.67	X Brace	No	No	0.0000	0.0000
T7	80.00-60.00	3.33	Double K1	No	Yes	0.0000	0.0000
T8	60.00-40.00	10.00	X Brace	No	Yes	0.0000	0.0000
T9	40.00-20.00	10.00	X Brace	No	Yes	0.0000	0.0000
T10	20.00-0.00	5.00	Double K1	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 185.00-180.00	Pipe	P2x.154	A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T2 180.00-160.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T3 160.00-140.00	Pipe	P2.5x.375	A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T4 140.00-120.00	Pipe	P3.5x.318	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T5 120.00-100.00	Pipe	P5x.258	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T6 100.00-80.00	Pipe	P5x.375	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T7 80.00-60.00	Pipe	P5x.375	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T8 60.00-40.00	Pipe	P5x0.5	A572-50 (50 ksi)	Equal Angle	L3x3x3/8	A36 (36 ksi)
T9 40.00-20.00	Pipe	P8x.322	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T10 20.00-0.00	Pipe	P8x.322	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 185.00-180.00	Equal Angle	L2x2x1/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T2 180.00-160.00	Equal Angle	L2x2x1/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T3 160.00-140.00	Equal Angle	L2x2x1/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T7 80.00-60.00	None	Single Angle		A36 (36 ksi)	Equal Angle	L3x3x3/8	A36 (36 ksi)
T10 20.00-0.00	None	Single Angle		A36 (36 ksi)	Equal Angle	L3 1/2x3 1/2x1/2	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 140.00-120.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T5 120.00-100.00	Equal Angle	L2 1/2x2 1/2x3/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T8 60.00-40.00	Equal Angle	L3x3x7/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T9 40.00-20.00	Equal Angle	L3x3x1/2	A36 (36 ksi)	Equal Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T7	A36	Horizontal (1)	Single Angle	L3x3x1/2	1
80.00-60.00	(36 ksi)	Diagonal (1)	Single Angle	L3x3x1/2	1
T10	A36	Horizontal (1)	Single Angle	L3x3x1/2	1
20.00-0.00	(36 ksi)	Diagonal (1)	Single Angle	L3x3x1/2	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 185.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T6 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 185.00-180.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 180.00-160.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 160.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 140.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 100.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 60.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 20.00-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 185.00-180.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T2 180.00-160.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 160.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 100.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 185.00-180.00	Flange	0.7500 A325N	6	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 180.00-160.00	Flange	0.7500 A325N	6	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	0
T3 160.00-140.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325X	0
T4 140.00-120.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0
T5 120.00-100.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0
T6 100.00-80.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T7 80.00-60.00	Flange	1.0000 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T8 60.00-40.00	Flange	1.2500 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T9 40.00-20.00	Flange	1.2500 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T10 20.00-0.00	Flange	1.5000 A449	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1-5/8 FOAM) (Verizon - Existing)	A	No	No	Ar (CaAa)	164.50 - 0.00	-9.0000	0.15	18	6	1.9800	1.9800		0.82
HYBRIFLEX 1-5/8" (Verizon - Existing)	A	No	No	Ar (CaAa)	164.50 - 0.00	-9.0000	0.2	1	1	1.9800	1.9800		1.90
LDF7-50A (1-5/8 FOAM) (AT&T - Existing)	A	No	No	Ar (CaAa)	154.50 - 0.00	0.0000	0.15	12	6	1.9800	1.9800		0.82
3" dia Flex Conuit (AT&T - Existing)	A	No	No	Ar (CaAa)	154.50 - 0.00	0.0000	0.2	1	1	3.0000	3.0000		5.00
LDF5-50A (7/8 FOAM) (Municipal - Existing)	B	No	No	Ar (CaAa)	152.00 - 0.00	-2.0000	0.15	4	4	1.0900	1.0900		0.33
LDF5-50A (7/8 FOAM) (Municipal - Existing)	B	No	No	Ar (CaAa)	185.00 - 0.00	-2.0000	0.13	3	3	1.0900	1.0900		0.33
HYBRIFLEX 1-1/4" (Sprint - Existing)	C	No	No	Ar (CaAa)	177.00 - 0.00	-1.5000	0.15	4	4	1.5400	1.5400		1.30
LDF7-50A (1-5/8 FOAM) (T-Mobile)	B	No	No	Ar (CaAa)	185.00 - 0.00	0.0000	0.15	10	10	1.9800	1.9800		0.82
HYBRIFLEX 1-5/8" (T-Mobile)	B	No	No	Ar (CaAa)	185.00 - 0.00	0.0000	0.25	3	3	1.9800	1.9800		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	185.00-180.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	14.505	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	0.000	0.000	16.929	0.000	0.07
		B	0.000	0.000	58.020	0.000	0.30
		C	0.000	0.000	10.472	0.000	0.09
T3	160.00-140.00	A	0.000	0.000	114.042	0.000	0.55
		B	0.000	0.000	63.252	0.000	0.31
		C	0.000	0.000	12.320	0.000	0.10
T4	140.00-120.00	A	0.000	0.000	128.760	0.000	0.63
		B	0.000	0.000	66.740	0.000	0.32
		C	0.000	0.000	12.320	0.000	0.10
T5	120.00-100.00	A	0.000	0.000	128.760	0.000	0.63
		B	0.000	0.000	66.740	0.000	0.32
		C	0.000	0.000	12.320	0.000	0.10
T6	100.00-80.00	A	0.000	0.000	128.760	0.000	0.63

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	66.740	0.000	0.32
		C	0.000	0.000	12.320	0.000	0.10
T7	80.00-60.00	A	0.000	0.000	128.760	0.000	0.63
		B	0.000	0.000	66.740	0.000	0.32
		C	0.000	0.000	12.320	0.000	0.10
T8	60.00-40.00	A	0.000	0.000	128.760	0.000	0.63
		B	0.000	0.000	66.740	0.000	0.32
		C	0.000	0.000	12.320	0.000	0.10
T9	40.00-20.00	A	0.000	0.000	128.760	0.000	0.63
		B	0.000	0.000	66.740	0.000	0.32
		C	0.000	0.000	12.320	0.000	0.10
T10	20.00-0.00	A	0.000	0.000	128.760	0.000	0.63
		B	0.000	0.000	66.740	0.000	0.32
		C	0.000	0.000	12.320	0.000	0.10

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	185.00-180.00	A	1.780	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	41.402	0.000	0.63
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	1.767	0.000	0.000	18.602	0.000	0.60
		B		0.000	0.000	165.372	0.000	2.49
		C		0.000	0.000	32.273	0.000	0.48
T3	160.00-140.00	A	1.745	0.000	0.000	140.737	0.000	4.10
		B		0.000	0.000	182.998	0.000	2.68
		C		0.000	0.000	37.828	0.000	0.56
T4	140.00-120.00	A	1.720	0.000	0.000	162.325	0.000	4.62
		B		0.000	0.000	194.395	0.000	2.79
		C		0.000	0.000	37.670	0.000	0.56
T5	120.00-100.00	A	1.692	0.000	0.000	161.722	0.000	4.59
		B		0.000	0.000	193.672	0.000	2.75
		C		0.000	0.000	37.488	0.000	0.55
T6	100.00-80.00	A	1.658	0.000	0.000	161.010	0.000	4.54
		B		0.000	0.000	192.821	0.000	2.71
		C		0.000	0.000	37.274	0.000	0.54
T7	80.00-60.00	A	1.617	0.000	0.000	160.138	0.000	4.49
		B		0.000	0.000	191.780	0.000	2.66
		C		0.000	0.000	37.013	0.000	0.53
T8	60.00-40.00	A	1.564	0.000	0.000	159.006	0.000	4.41
		B		0.000	0.000	190.428	0.000	2.59
		C		0.000	0.000	36.674	0.000	0.51
T9	40.00-20.00	A	1.486	0.000	0.000	157.359	0.000	4.31
		B		0.000	0.000	188.466	0.000	2.49
		C		0.000	0.000	36.182	0.000	0.49
T10	20.00-0.00	A	1.331	0.000	0.000	154.094	0.000	4.11
		B		0.000	0.000	184.587	0.000	2.29
		C		0.000	0.000	35.210	0.000	0.46

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	185.00-180.00	9.3029	-0.1034	11.0967	-0.0597
T2	180.00-160.00	6.6341	-0.5668	8.8290	0.6446
T3	160.00-140.00	1.0617	-7.4816	5.3355	-4.1891
T4	140.00-120.00	0.3254	-9.6966	5.6895	-5.7588
T5	120.00-100.00	0.1688	-11.4510	6.7684	-7.0218
T6	100.00-80.00	0.0349	-14.1835	8.2051	-8.6273
T7	80.00-60.00	-0.0737	-12.1829	6.8116	-7.3883
T8	60.00-40.00	-0.2128	-16.8961	9.8183	-10.6133
T9	40.00-20.00	-0.3058	-17.4828	10.2172	-11.1551
T10	20.00-0.00	-0.3385	-16.1159	9.6371	-10.7144

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	6	LDF5-50A (7/8 FOAM)	180.00 - 185.00	0.6000	0.5316
T1	8	LDF7-50A (1-5/8 FOAM)	180.00 - 185.00	0.6000	0.5316
T1	9	HYBRIFLEX 1-5/8"	180.00 - 185.00	0.6000	0.5316
T2	1	LDF7-50A (1-5/8 FOAM)	160.00 - 164.50	0.6000	0.5623
T2	2	HYBRIFLEX 1-5/8"	160.00 - 164.50	0.6000	0.5623
T2	6	LDF5-50A (7/8 FOAM)	160.00 - 180.00	0.6000	0.5623
T2	7	HYBRIFLEX 1-1/4"	160.00 - 177.00	0.6000	0.5623
T2	8	LDF7-50A (1-5/8 FOAM)	160.00 - 180.00	0.6000	0.5623
T2	9	HYBRIFLEX 1-5/8"	160.00 - 180.00	0.6000	0.5623
T3	1	LDF7-50A (1-5/8 FOAM)	140.00 - 160.00	0.6000	0.6000
T3	2	HYBRIFLEX 1-5/8"	140.00 - 160.00	0.6000	0.6000
T3	3	LDF7-50A (1-5/8 FOAM)	140.00 - 154.50	0.6000	0.6000
T3	4	3" dia Flex Conuit	140.00 - 154.50	0.6000	0.6000
T3	5	LDF5-50A (7/8 FOAM)	140.00 - 152.00	0.6000	0.6000
T3	6	LDF5-50A (7/8 FOAM)	140.00 - 160.00	0.6000	0.6000
T3	7	HYBRIFLEX 1-1/4"	140.00 - 160.00	0.6000	0.6000
T3	8	LDF7-50A (1-5/8 FOAM)	140.00 - 160.00	0.6000	0.6000
T3	9	HYBRIFLEX 1-5/8"	140.00 - 160.00	0.6000	0.6000
T4	1	LDF7-50A (1-5/8 FOAM)	120.00 - 140.00	0.6000	0.5847
T4	2	HYBRIFLEX 1-5/8"	120.00 - 140.00	0.6000	0.5847

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	3	LDF7-50A (1-5/8 FOAM)	120.00 - 140.00	0.6000	0.5847
T4	4	3" dia Flex Conuit	120.00 - 140.00	0.6000	0.5847
T4	5	LDF5-50A (7/8 FOAM)	120.00 - 140.00	0.6000	0.5847
T4	6	LDF5-50A (7/8 FOAM)	120.00 - 140.00	0.6000	0.5847
T4	7	HYBRIFLEX 1-1/4"	120.00 - 140.00	0.6000	0.5847
T4	8	LDF7-50A (1-5/8 FOAM)	120.00 - 140.00	0.6000	0.5847
T4	9	HYBRIFLEX 1-5/8"	120.00 - 140.00	0.6000	0.5847
T5	1	LDF7-50A (1-5/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	2	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.6000
T5	3	LDF7-50A (1-5/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	4	3" dia Flex Conuit	100.00 - 120.00	0.6000	0.6000
T5	5	LDF5-50A (7/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	6	LDF5-50A (7/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	7	HYBRIFLEX 1-1/4"	100.00 - 120.00	0.6000	0.6000
T5	8	LDF7-50A (1-5/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	9	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.6000
T6	1	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	2	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.6000
T6	3	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	4	3" dia Flex Conuit	80.00 - 100.00	0.6000	0.6000
T6	5	LDF5-50A (7/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	6	LDF5-50A (7/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	7	HYBRIFLEX 1-1/4"	80.00 - 100.00	0.6000	0.6000
T6	8	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	9	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.6000
T7	1	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.5244
T7	2	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.5244
T7	3	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.5244
T7	4	3" dia Flex Conuit	60.00 - 80.00	0.6000	0.5244
T7	5	LDF5-50A (7/8 FOAM)	60.00 - 80.00	0.6000	0.5244
T7	6	LDF5-50A (7/8 FOAM)	60.00 - 80.00	0.6000	0.5244
T7	7	HYBRIFLEX 1-1/4"	60.00 - 80.00	0.6000	0.5244
T7	8	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.5244
T7	9	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.5244
T8	1	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	2	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T8	3	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	4	3" dia Flex Conuit	40.00 - 60.00	0.6000	0.6000
T8	5	LDF5-50A (7/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	6	LDF5-50A (7/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	7	HYBRIFLEX 1-1/4"	40.00 - 60.00	0.6000	0.6000
T8	8	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	9	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T9	1	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T9	2	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.6000
T9	3	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	4	3" dia Flex Conuit	20.00 - 40.00	0.6000	0.6000
T9	5	LDF5-50A (7/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T9	6	LDF5-50A (7/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T9	7	HYBRIFLEX 1-1/4"	20.00 - 40.00	0.6000	0.6000
T9	8	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T9	9	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.6000
T10	1	LDF7-50A (1-5/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T10	2	HYBRIFLEX 1-5/8"	0.00 - 20.00	0.6000	0.6000
T10	3	LDF7-50A (1-5/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T10	4	3" dia Flex Conuit	0.00 - 20.00	0.6000	0.6000
T10	5	LDF5-50A (7/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T10	6	LDF5-50A (7/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T10	7	HYBRIFLEX 1-1/4"	0.00 - 20.00	0.6000	0.6000
T10	8	LDF7-50A (1-5/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T10	9	HYBRIFLEX 1-5/8"	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DB222	A	From Leg	6.00	0.0000	185.00	No Ice	1.60	1.60	0.02
			0.00			1/2" Ice	2.88	2.88	0.02
			5.00			1" Ice	4.16	4.16	0.03
DB222	C	From Leg	6.00	0.0000	185.00	No Ice	1.60	1.60	0.02
			0.00			1/2" Ice	2.88	2.88	0.02
			5.00			1" Ice	4.16	4.16	0.03
DB636-A	A	From Leg	6.00	0.0000	185.00	No Ice	2.78	2.78	0.03
			0.00			1/2" Ice	3.96	3.96	0.05
			7.00			1" Ice	5.16	5.16	0.08
AIR21 B2A/B4P	A	From Leg	3.00	0.0000	185.00	No Ice	6.05	4.36	0.08
(T-Mobile - Existing)			0.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
AIR21 B2A/B4P	B	From Leg	3.00	0.0000	185.00	No Ice	6.05	4.36	0.08
(T-Mobile - Existing)			0.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
AIR21 B2A/B4P	C	From Leg	3.00	0.0000	185.00	No Ice	6.05	4.36	0.08
(T-Mobile - Existing)			0.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
AIR32	A	From Leg	3.00	0.0000	185.00	No Ice	6.51	4.71	0.13
(T-Mobile - Proposed)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR32	B	From Leg	3.00	0.0000	185.00	No Ice	6.51	4.71	0.13
(T-Mobile - Proposed)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR32	C	From Leg	3.00	0.0000	185.00	No Ice	6.51	4.71	0.13
(T-Mobile - Proposed)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
APXVAARR24-43	A	From Leg	3.00	0.0000	185.00	No Ice	20.24	8.89	0.16
(T-Mobile - Proposed)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVAARR24-43	B	From Leg	3.00	0.0000	185.00	No Ice	20.24	8.89	0.16
(T-Mobile - Proposed)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
APXVAARR24-43	C	From Leg	3.00	0.0000	185.00	No Ice	20.24	8.89	0.16
(T-Mobile - Proposed)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
Radio 4449 B71 B12	A	From Leg	3.00	0.0000	185.00	No Ice	1.64	1.29	0.07
(T-Mobile - Proposed)			-5.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	B	From Leg	3.00	0.0000	185.00	No Ice	1.64	1.29	0.07
(T-Mobile - Proposed)			-5.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	C	From Leg	3.00	0.0000	185.00	No Ice	1.64	1.29	0.07
(T-Mobile - Proposed)			-5.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
TMA 10"x8"x3"	A	From Leg	3.00	0.0000	185.00	No Ice	0.00	0.29	0.02
(T-Mobile - Existing)			0.00			1/2" Ice	0.00	0.38	0.02
			0.00			1" Ice	0.00	0.48	0.03
TMA 10"x8"x3"	B	From Leg	3.00	0.0000	185.00	No Ice	0.00	0.29	0.02
(T-Mobile - Existing)			0.00			1/2" Ice	0.00	0.38	0.02
			0.00			1" Ice	0.00	0.48	0.03
TMA 10"x8"x3"	C	From Leg	3.00	0.0000	185.00	No Ice	0.00	0.29	0.02
(T-Mobile - Existing)			0.00			1/2" Ice	0.00	0.38	0.02
			0.00			1" Ice	0.00	0.48	0.03
Pirod 12' T-Frame Sector	A	From Leg	1.50	0.0000	185.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(T-Mobile - Existing)			0.00			1" Ice	23.20	23.20	0.73
Pirod 12' T-Frame Sector	B	From Leg	1.50	0.0000	185.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(T-Mobile - Existing)			0.00			1" Ice	23.20	23.20	0.73
Pirod 12' T-Frame Sector	C	From Leg	1.50	0.0000	185.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(T-Mobile - Existing)			0.00			1" Ice	23.20	23.20	0.73
APXVSPP18-C-A20	A	From Leg	3.00	0.0000	174.00	No Ice	8.02	5.28	0.06
(Sprint - Existing)			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVSPP18-C-A20	B	From Leg	3.00	0.0000	174.00	No Ice	8.02	5.28	0.06
(Sprint - Existing)			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVSPP18-C-A20	C	From Leg	3.00	0.0000	174.00	No Ice	8.02	5.28	0.06
(Sprint - Existing)			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVTM14	A	From Leg	3.00	0.0000	174.00	No Ice	6.34	3.61	0.06
(Sprint - Existing)			0.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	B	From Leg	3.00	0.0000	174.00	No Ice	6.34	3.61	0.06
(Sprint - Existing)			0.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	C	From Leg	3.00	0.0000	174.00	No Ice	6.34	3.61	0.06
(Sprint - Existing)			0.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
FD-RRH 2x50 800	A	From Leg	3.00	0.0000	174.00	No Ice	2.06	1.93	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	B	From Leg	3.00	0.0000	174.00	No Ice	2.06	1.93	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
FD-RRH 2x50 800	C	From Leg	3.00	0.0000	174.00	No Ice	2.06	1.93	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 4x45 1900	A	From Leg	3.00	0.0000	174.00	No Ice	2.32	2.38	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	B	From Leg	3.00	0.0000	174.00	No Ice	2.32	2.38	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	C	From Leg	3.00	0.0000	174.00	No Ice	2.32	2.38	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
TD-RRH8x20-25	A	From Leg	3.00	0.0000	174.00	No Ice	4.05	1.53	0.07
(Sprint - Existing)			0.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Leg	3.00	0.0000	174.00	No Ice	4.05	1.53	0.07
(Sprint - Existing)			0.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Leg	3.00	0.0000	174.00	No Ice	4.05	1.53	0.07
(Sprint - Existing)			0.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
Pirod 12' T-Frame Sector	A	From Leg	1.50	0.0000	174.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(Sprint - Existing)			0.00			1" Ice	23.20	23.20	0.73
Pirod 12' T-Frame Sector	B	From Leg	1.50	0.0000	174.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(Sprint - Existing)			0.00			1" Ice	23.20	23.20	0.73
Pirod 12' T-Frame Sector	C	From Leg	1.50	0.0000	174.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(Sprint - Existing)			0.00			1" Ice	23.20	23.20	0.73
DB846F65ZAXY	A	From Leg	3.00	0.0000	164.00	No Ice	7.03	6.16	0.02
(Verizon - Existing)			-6.00			1/2" Ice	7.49	6.62	0.07
			0.00			1" Ice	7.94	7.09	0.12
BXA-70063/6CF	A	From Leg	3.00	0.0000	164.00	No Ice	7.57	4.16	0.01
(Verizon - Existing)			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
DB846F65ZAXY	A	From Leg	5.00	0.0000	164.00	No Ice	7.03	6.16	0.02
(Verizon - Existing)			6.00			1/2" Ice	7.49	6.62	0.07
			0.00			1" Ice	7.94	7.09	0.12
DB846H80E-SX	B	From Leg	3.00	0.0000	164.00	No Ice	5.09	6.06	0.02
(Verizon - Existing)			-6.00			1/2" Ice	5.55	6.52	0.05
			0.00			1" Ice	6.01	6.99	0.10
BXA-70063/6CF	B	From Leg	3.00	0.0000	164.00	No Ice	7.57	4.16	0.01
(Verizon - Existing)			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
DB846H80E-SX	B	From Leg	5.00	0.0000	164.00	No Ice	5.09	6.06	0.02
(Verizon - Existing)			6.00			1/2" Ice	5.55	6.52	0.05
			0.00			1" Ice	6.01	6.99	0.10
DB846F65ZAXY	C	From Leg	3.00	0.0000	164.00	No Ice	7.03	6.16	0.02
(Verizon - Existing)			-6.00			1/2" Ice	7.49	6.62	0.07
			0.00			1" Ice	7.94	7.09	0.12
BXA-70063/6CF	C	From Leg	3.00	0.0000	164.00	No Ice	7.57	4.16	0.01
(Verizon - Existing)			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
DB846F65ZAXY	C	From Leg	5.00	0.0000	164.00	No Ice	7.03	6.16	0.02
(Verizon - Existing)			6.00			1/2" Ice	7.49	6.62	0.07
			0.00			1" Ice	7.94	7.09	0.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
742-213	A	From Leg	3.00	0.0000	164.00	No Ice	5.17	2.99	0.02
(Verizon - Existing)			-4.00			1/2" Ice	5.65	3.57	0.05
			0.00			1" Ice	6.13	4.04	0.08
742-213	A	From Leg	3.00	0.0000	164.00	No Ice	5.17	2.99	0.02
(Verizon - Existing)			4.00			1/2" Ice	5.65	3.57	0.05
			0.00			1" Ice	6.13	4.04	0.08
742-213	B	From Leg	3.00	0.0000	164.00	No Ice	5.17	2.99	0.02
(Verizon - Existing)			-4.00			1/2" Ice	5.65	3.57	0.05
			0.00			1" Ice	6.13	4.04	0.08
742-213	B	From Leg	3.00	0.0000	164.00	No Ice	5.17	2.99	0.02
(Verizon - Existing)			4.00			1/2" Ice	5.65	3.57	0.05
			0.00			1" Ice	6.13	4.04	0.08
742-213	C	From Leg	3.00	0.0000	164.00	No Ice	5.17	2.99	0.02
(Verizon - Existing)			-4.00			1/2" Ice	5.65	3.57	0.05
			0.00			1" Ice	6.13	4.04	0.08
742-213	C	From Leg	3.00	0.0000	164.00	No Ice	5.17	2.99	0.02
(Verizon - Existing)			4.00			1/2" Ice	5.65	3.57	0.05
			0.00			1" Ice	6.13	4.04	0.08
RRH2x40-AWS	A	From Leg	3.00	0.0000	164.00	No Ice	0.00	1.59	0.04
(Verizon - Existing)			0.00			1/2" Ice	0.00	1.80	0.06
			0.00			1" Ice	0.00	2.01	0.08
RRH2x40-AWS	B	From Leg	3.00	0.0000	164.00	No Ice	0.00	1.59	0.04
(Verizon - Existing)			0.00			1/2" Ice	0.00	1.80	0.06
			0.00			1" Ice	0.00	2.01	0.08
RRH2x40-AWS	C	From Leg	3.00	0.0000	164.00	No Ice	0.00	1.59	0.04
(Verizon - Existing)			0.00			1/2" Ice	0.00	1.80	0.06
			0.00			1" Ice	0.00	2.01	0.08
DB-T1-6Z-8AB-0Z	C	From Leg	3.00	0.0000	164.00	No Ice	4.80	2.00	0.04
(Verizon - Existing)			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
Valmont 15' T-Frame P/N	A	From Leg	2.00	0.0000	164.00	No Ice	13.90	13.90	0.39
860109			0.00			1/2" Ice	20.00	20.00	0.53
(Verizon - Existing)			0.00			1" Ice	26.10	26.10	0.67
Valmont 15' T-Frame P/N	B	From Leg	2.00	0.0000	164.00	No Ice	13.90	13.90	0.39
860109			0.00			1/2" Ice	20.00	20.00	0.53
(Verizon - Existing)			0.00			1" Ice	26.10	26.10	0.67
Valmont 15' T-Frame P/N	C	From Leg	2.00	0.0000	164.00	No Ice	13.90	13.90	0.39
860109			0.00			1/2" Ice	20.00	20.00	0.53
(Verizon - Existing)			0.00			1" Ice	26.10	26.10	0.67
7770.00	A	From Face	2.00	0.0000	151.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			-5.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
7770.00	B	From Face	2.00	0.0000	151.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			-5.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
7770.00	C	From Face	2.00	0.0000	151.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			-5.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
HPA65R-BU6A	A	From Face	2.00	0.0000	151.00	No Ice	7.85	5.61	0.04
(AT&T - Existing)			5.00			1/2" Ice	8.30	6.06	0.09
			0.00			1" Ice	8.76	6.52	0.15
HPA65R-BU6A	B	From Face	2.00	0.0000	151.00	No Ice	7.85	5.61	0.04
(AT&T - Existing)			5.00			1/2" Ice	8.30	6.06	0.09
			0.00			1" Ice	8.76	6.52	0.15
HPA65R-BU6A	C	From Face	2.00	0.0000	151.00	No Ice	7.85	5.61	0.04
(AT&T - Existing)			5.00			1/2" Ice	8.30	6.06	0.09
			0.00			1" Ice	8.76	6.52	0.15

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
P65-16-XLH-RR	A	From Face	2.00	0.0000	151.00	No Ice	8.13	4.70	0.06
(AT&T - Existing)			0.00			1/2" Ice	8.59	5.15	0.11
			0.00			1" Ice	9.05	5.60	0.16
P65-16-XLH-RR	B	From Face	2.00	0.0000	151.00	No Ice	8.13	4.70	0.06
(AT&T - Existing)			0.00			1/2" Ice	8.59	5.15	0.11
			0.00			1" Ice	9.05	5.60	0.16
P65-16-XLH-RR	C	From Face	2.00	0.0000	151.00	No Ice	8.13	4.70	0.06
(AT&T - Existing)			0.00			1/2" Ice	8.59	5.15	0.11
			0.00			1" Ice	9.05	5.60	0.16
(2) LGP21401 TMA	A	From Face	2.00	0.0000	151.00	No Ice	0.82	0.35	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP21401 TMA	B	From Face	2.00	0.0000	151.00	No Ice	0.82	0.35	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP21401 TMA	C	From Face	2.00	0.0000	151.00	No Ice	0.82	0.35	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
RRUS-11	A	From Face	2.00	0.0000	151.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	B	From Face	2.00	0.0000	151.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	C	From Face	2.00	0.0000	151.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
4415 B25	A	From Face	2.00	0.0000	151.00	No Ice	1.84	0.82	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.01	0.94	0.06
			0.00			1" Ice	2.19	1.07	0.08
4415 B25	B	From Face	2.00	0.0000	151.00	No Ice	1.84	0.82	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.01	0.94	0.06
			0.00			1" Ice	2.19	1.07	0.08
4415 B25	C	From Face	2.00	0.0000	151.00	No Ice	1.84	0.82	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.01	0.94	0.06
			0.00			1" Ice	2.19	1.07	0.08
DC6-48-60-18-8F Surge	A	From Face	2.00	0.0000	151.00	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T - Existing)			0.00			1" Ice	2.29	2.29	0.06
Pirod 10' PCS Frame (1)	A	From Leg	1.50	0.0000	151.00	No Ice	9.00	9.00	0.25
(AT&T - Existing)			0.00			1/2" Ice	13.20	13.20	0.35
			0.00			1" Ice	17.40	17.40	0.45
Pirod 10' PCS Frame (1)	B	From Leg	1.50	0.0000	151.00	No Ice	9.00	9.00	0.25
(AT&T - Existing)			0.00			1/2" Ice	13.20	13.20	0.35
			0.00			1" Ice	17.40	17.40	0.45
Pirod 10' PCS Frame (1)	C	From Leg	1.50	0.0000	151.00	No Ice	9.00	9.00	0.25
(AT&T - Existing)			0.00			1/2" Ice	13.20	13.20	0.35
			0.00			1" Ice	17.40	17.40	0.45
DB222	A	From Leg	6.00	0.0000	145.00	No Ice	1.60	1.60	0.02
			0.00			1/2" Ice	2.88	2.88	0.02
			-5.00			1" Ice	4.16	4.16	0.03
DB222	C	From Leg	6.00	0.0000	145.00	No Ice	1.60	1.60	0.02
			0.00			1/2" Ice	2.88	2.88	0.02
			-5.00			1" Ice	4.16	4.16	0.03
DB636-A	A	From Leg	6.00	0.0000	145.00	No Ice	2.78	2.78	0.03
			0.00			1/2" Ice	3.96	3.96	0.05
			7.00			1" Ice	5.16	5.16	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DB636-A	C	From Leg	6.00	0.0000	145.00	No Ice	2.78	2.78	0.03
			0.00			1/2" Ice	3.96	3.96	0.05
			7.00			1" Ice	5.16	5.16	0.08
Pirod 6' Side Mount Standoff (1)	A	From Leg	3.00	0.0000	145.00	No Ice	4.97	4.97	0.07
			0.00			1/2" Ice	6.12	6.12	0.13
			0.00			1" Ice	7.27	7.27	0.19
Pirod 6' Side Mount Standoff (1)	C	From Leg	3.00	0.0000	145.00	No Ice	4.97	4.97	0.07
			0.00			1/2" Ice	6.12	6.12	0.13
			0.00			1" Ice	7.27	7.27	0.19

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
3-ft dish	B	Paraboloid w/o Radome	From Leg	2.00	0.0000		138.00	3.00	No Ice	7.07	0.06
				0.00					1/2" Ice	7.47	0.10
				0.00					1" Ice	7.86	0.14

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	182.50	1.174	22	25.990	A	2.850	1.979	1.979	40.98	0.000	0.000
185.00-180.00					B	2.850	1.979		40.98	14.505	0.000
					C	2.850	1.979		40.98	0.000	0.000
T2	170.00	1.15	22	104.792	A	9.786	9.583	9.583	49.48	16.929	0.000
180.00-160.00					B	9.786	9.583		49.48	58.020	0.000
					C	9.786	9.583		49.48	10.472	0.000
T3	150.00	1.11	21	124.798	A	10.802	9.599	9.599	47.05	114.042	0.000
160.00-140.00					B	10.802	9.599		47.05	63.252	0.000
					C	10.802	9.599		47.05	12.320	0.000
T4	130.00	1.065	20	166.675	A	17.186	13.356	13.356	43.73	128.760	0.000
140.00-120.00					B	17.186	13.356		43.73	66.740	0.000
					C	17.186	13.356		43.73	12.320	0.000
T5	110.00	1.016	19	209.283	A	20.319	18.574	18.574	47.76	128.760	0.000
120.00-100.00					B	20.319	18.574		47.76	66.740	0.000
					C	20.319	18.574		47.76	12.320	0.000
T6	90.00	0.959	18	249.283	A	16.501	18.574	18.574	52.96	128.760	0.000
100.00-80.00					B	16.501	18.574		52.96	66.740	0.000
					C	16.501	18.574		52.96	12.320	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T7 80.00-60.00	70.00	0.892	17	289.283	A	53.313	18.574	18.574	25.84	128.760	0.000
					B	53.313	18.574		25.84	66.740	0.000
					C	53.313	18.574		25.84	12.320	0.000
T8 60.00-40.00	50.00	0.811	15	329.283	A	26.086	18.574	18.574	41.59	128.760	0.000
					B	26.086	18.574		41.59	66.740	0.000
					C	26.086	18.574		41.59	12.320	0.000
T9 40.00-20.00	30.00	0.701	13	374.393	A	31.787	28.798	28.798	47.53	128.760	0.000
					B	31.787	28.798		47.53	66.740	0.000
					C	31.787	28.798		47.53	12.320	0.000
T10 20.00-0.00	10.00	0.7	13	414.393	A	56.062	28.798	28.798	33.94	128.760	0.000
					B	56.062	28.798		33.94	66.740	0.000
					C	56.062	28.798		33.94	12.320	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	182.50	1.174	6	1.7798	27.473	A	2.850	10.018	4.945	38.43	0.000	0.000
185.00-180.00						B	2.850	10.018		38.43	41.402	0.000
						C	2.850	10.018		38.43	0.000	0.000
T2	170.00	1.15	6	1.7672	110.682	A	9.786	38.659	21.365	44.10	18.602	0.000
180.00-160.00						B	9.786	38.659		44.10	165.372	0.000
						C	9.786	38.659		44.10	32.273	0.000
T3	150.00	1.11	6	1.7452	130.622	A	10.802	40.105	21.253	41.75	140.737	0.000
160.00-140.00						B	10.802	40.105		41.75	182.998	0.000
						C	10.802	40.105		41.75	37.828	0.000
T4	130.00	1.065	6	1.7204	172.417	A	17.186	54.411	24.844	34.70	162.325	0.000
140.00-120.00						B	17.186	54.411		34.70	194.395	0.000
						C	17.186	54.411		34.70	37.670	0.000
T5	110.00	1.016	6	1.6919	214.930	A	20.319	57.375	29.872	38.45	161.722	0.000
120.00-100.00						B	20.319	57.375		38.45	193.672	0.000
						C	20.319	57.375		38.45	37.488	0.000
T6 100.00-80.00	90.00	0.959	5	1.6583	254.818	A	16.501	51.539	29.648	43.57	161.010	0.000
						B	16.501	51.539		43.57	192.821	0.000
						C	16.501	51.539		43.57	37.274	0.000
T7 80.00-60.00	70.00	0.892	5	1.6171	294.680	A	53.313	86.850	29.373	20.96	160.138	0.000
						B	53.313	86.850		20.96	191.780	0.000
						C	53.313	86.850		20.96	37.013	0.000
T8 60.00-40.00	50.00	0.811	4	1.5636	334.502	A	26.086	56.208	29.016	35.26	159.006	0.000
						B	26.086	56.208		35.26	190.428	0.000
						C	26.086	56.208		35.26	36.674	0.000
T9 40.00-20.00	30.00	0.701	4	1.4858	379.352	A	31.787	66.929	38.720	39.22	157.359	0.000
						B	31.787	66.929		39.22	188.466	0.000
						C	31.787	66.929		39.22	36.182	0.000
T10 20.00-0.00	10.00	0.7	4	1.3312	418.836	A	56.062	82.825	37.687	27.14	154.094	0.000
						B	56.062	82.825		27.14	184.587	0.000
						C	56.062	82.825		27.14	35.210	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	182.50	1.174	9	25.990	A	2.850	1.979	1.979	40.98	0.000	0.000
185.00-180.00					B	2.850	1.979		40.98	14.505	0.000
					C	2.850	1.979		40.98	0.000	0.000
T2	170.00	1.15	9	104.792	A	9.786	9.583	9.583	49.48	16.929	0.000
180.00-160.00					B	9.786	9.583		49.48	58.020	0.000
					C	9.786	9.583		49.48	10.472	0.000
T3	150.00	1.11	9	124.798	A	10.802	9.599	9.599	47.05	114.042	0.000
160.00-140.00					B	10.802	9.599		47.05	63.252	0.000
					C	10.802	9.599		47.05	12.320	0.000
T4	130.00	1.065	8	166.675	A	17.186	13.356	13.356	43.73	128.760	0.000
140.00-120.00					B	17.186	13.356		43.73	66.740	0.000
					C	17.186	13.356		43.73	12.320	0.000
T5	110.00	1.016	8	209.283	A	20.319	18.574	18.574	47.76	128.760	0.000
120.00-100.00					B	20.319	18.574		47.76	66.740	0.000
					C	20.319	18.574		47.76	12.320	0.000
T6	90.00	0.959	8	249.283	A	16.501	18.574	18.574	52.96	128.760	0.000
100.00-80.00					B	16.501	18.574		52.96	66.740	0.000
					C	16.501	18.574		52.96	12.320	0.000
T7 80.00-60.00	70.00	0.892	7	289.283	A	53.313	18.574	18.574	25.84	128.760	0.000
					B	53.313	18.574		25.84	66.740	0.000
					C	53.313	18.574		25.84	12.320	0.000
T8 60.00-40.00	50.00	0.811	6	329.283	A	26.086	18.574	18.574	41.59	128.760	0.000
					B	26.086	18.574		41.59	66.740	0.000
					C	26.086	18.574		41.59	12.320	0.000
T9 40.00-20.00	30.00	0.701	5	374.393	A	31.787	28.798	28.798	47.53	128.760	0.000
					B	31.787	28.798		47.53	66.740	0.000
					C	31.787	28.798		47.53	12.320	0.000
T10 20.00-0.00	10.00	0.7	5	414.393	A	56.062	28.798	28.798	33.94	128.760	0.000
					B	56.062	28.798		33.94	66.740	0.000
					C	56.062	28.798		33.94	12.320	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	0.14	A	0.186	2.644	22	1	1	3.983	0.36	72.22	C
185.00-180.00			B	0.186	2.644		1	1	3.983			
			C	0.186	2.644		1	1	3.983			
T2	0.46	0.65	A	0.185	2.647	22	1	1	15.268	1.69	84.33	C
180.00-160.00			B	0.185	2.647		1	1	15.268			
			C	0.185	2.647		1	1	15.268			
T3	0.97	0.94	A	0.163	2.723	21	1	1	16.265	2.81	140.27	C
160.00-140.00			B	0.163	2.723		1	1	16.265			
			C	0.163	2.723		1	1	16.265			
T4	1.06	1.61	A	0.183	2.653	20	1	1	24.822	3.25	162.34	C
140.00-120.00			B	0.183	2.653		1	1	24.822			
			C	0.183	2.653		1	1	24.822			
T5	1.06	2.48	A	0.186	2.644	19	1	1	30.054	3.32	165.83	C
120.00-100.00			B	0.186	2.644		1	1	30.054			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.186	2.644		1	1	30.054			
T6	1.06	2.48	A	0.141	2.806	18	1	1	26.121	3.04	151.86	C
100.00-80.00			B	0.141	2.806		1	1	26.121			
			C	0.141	2.806		1	1	26.121			
T7	1.06	5.68	A	0.249	2.442	17	1	1	63.616	4.00	199.91	C
80.00-60.00			B	0.249	2.442		1	1	63.616			
			C	0.249	2.442		1	1	63.616			
T8	1.06	4.05	A	0.136	2.825	15	1	1	35.991	2.94	146.78	C
60.00-40.00			B	0.136	2.825		1	1	35.991			
			C	0.136	2.825		1	1	35.991			
T9	1.06	4.15	A	0.162	2.728	13	1	1	45.064	2.78	138.78	C
40.00-20.00			B	0.162	2.728		1	1	45.064			
			C	0.162	2.728		1	1	45.064			
T10	1.06	6.97	A	0.205	2.58	13	1	1	69.899	3.42	170.79	C
20.00-0.00			B	0.205	2.58		1	1	69.899			
			C	0.205	2.58		1	1	69.899			
Sum Weight:	8.91	29.14						OTM	2377.75 kip-ft	27.58		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	0.14	A	0.186	2.644	22	0.8	1	3.413	0.33	66.56	C
185.00-180.00			B	0.186	2.644		0.8	1	3.413			
			C	0.186	2.644		0.8	1	3.413			
T2	0.46	0.65	A	0.185	2.647	22	0.8	1	13.311	1.59	79.56	C
180.00-160.00			B	0.185	2.647		0.8	1	13.311			
			C	0.185	2.647		0.8	1	13.311			
T3	0.97	0.94	A	0.163	2.723	21	0.8	1	14.104	2.70	135.05	C
160.00-140.00			B	0.163	2.723		0.8	1	14.104			
			C	0.163	2.723		0.8	1	14.104			
T4	1.06	1.61	A	0.183	2.653	20	0.8	1	21.385	3.09	154.57	C
140.00-120.00			B	0.183	2.653		0.8	1	21.385			
			C	0.183	2.653		0.8	1	21.385			
T5	1.06	2.48	A	0.186	2.644	19	0.8	1	25.990	3.14	157.10	C
120.00-100.00			B	0.186	2.644		0.8	1	25.990			
			C	0.186	2.644		0.8	1	25.990			
T6	1.06	2.48	A	0.141	2.806	18	0.8	1	22.821	2.90	144.75	C
100.00-80.00			B	0.141	2.806		0.8	1	22.821			
			C	0.141	2.806		0.8	1	22.821			
T7	1.06	5.68	A	0.249	2.442	17	0.8	1	52.953	3.63	181.32	C
80.00-60.00			B	0.249	2.442		0.8	1	52.953			
			C	0.249	2.442		0.8	1	52.953			
T8	1.06	4.05	A	0.136	2.825	15	0.8	1	30.774	2.74	137.23	C
60.00-40.00			B	0.136	2.825		0.8	1	30.774			
			C	0.136	2.825		0.8	1	30.774			
T9	1.06	4.15	A	0.162	2.728	13	0.8	1	38.707	2.58	129.06	C
40.00-20.00			B	0.162	2.728		0.8	1	38.707			
			C	0.162	2.728		0.8	1	38.707			
T10	1.06	6.97	A	0.205	2.58	13	0.8	1	58.687	3.09	154.59	C
20.00-0.00			B	0.205	2.58		0.8	1	58.687			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.205	2.58		0.8	1	58.687			
Sum Weight:	8.91	29.14						OTM	2243.88 kip-ft	25.80		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.07	0.14	A	0.186	2.644	22	0.85	1	3.555	0.34	67.97	C
185.00-180.00			B	0.186	2.644		0.85	1	3.555			
			C	0.186	2.644		0.85	1	3.555			
T2	0.46	0.65	A	0.185	2.647	22	0.85	1	13.800	1.62	80.75	C
180.00-160.00			B	0.185	2.647		0.85	1	13.800			
			C	0.185	2.647		0.85	1	13.800			
T3	0.97	0.94	A	0.163	2.723	21	0.85	1	14.644	2.73	136.36	C
160.00-140.00			B	0.163	2.723		0.85	1	14.644			
			C	0.163	2.723		0.85	1	14.644			
T4	1.06	1.61	A	0.183	2.653	20	0.85	1	22.244	3.13	156.51	C
140.00-120.00			B	0.183	2.653		0.85	1	22.244			
			C	0.183	2.653		0.85	1	22.244			
T5	1.06	2.48	A	0.186	2.644	19	0.85	1	27.006	3.19	159.28	C
120.00-100.00			B	0.186	2.644		0.85	1	27.006			
			C	0.186	2.644		0.85	1	27.006			
T6	1.06	2.48	A	0.141	2.806	18	0.85	1	23.646	2.93	146.53	C
100.00-80.00			B	0.141	2.806		0.85	1	23.646			
			C	0.141	2.806		0.85	1	23.646			
T7	1.06	5.68	A	0.249	2.442	17	0.85	1	55.619	3.72	185.97	C
80.00-60.00			B	0.249	2.442		0.85	1	55.619			
			C	0.249	2.442		0.85	1	55.619			
T8	1.06	4.05	A	0.136	2.825	15	0.85	1	32.078	2.79	139.62	C
60.00-40.00			B	0.136	2.825		0.85	1	32.078			
			C	0.136	2.825		0.85	1	32.078			
T9	1.06	4.15	A	0.162	2.728	13	0.85	1	40.296	2.63	131.49	C
40.00-20.00			B	0.162	2.728		0.85	1	40.296			
			C	0.162	2.728		0.85	1	40.296			
T10	1.06	6.97	A	0.205	2.58	13	0.85	1	61.490	3.17	158.64	C
20.00-0.00			B	0.205	2.58		0.85	1	61.490			
			C	0.205	2.58		0.85	1	61.490			
Sum Weight:	8.91	29.14						OTM	2277.35 kip-ft	26.24		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.63	0.81	A	0.468	1.944	6	1	1	9.547	0.22	44.03	C
185.00-180.00			B	0.468	1.944		1	1	9.547			
			C	0.468	1.944		1	1	9.547			
T2	3.57	3.09	A	0.438	1.994	6	1	1	35.045	1.02	50.91	C
180.00-160.00			B	0.438	1.994		1	1	35.045			
			C	0.438	1.994		1	1	35.045			
T3	7.35	3.50	A	0.39	2.085	6	1	1	36.143	1.41*	70.37	C
160.00-140.00			B	0.39	2.085		1	1	36.143			
			C	0.39	2.085		1	1	36.143			
T4	7.97	5.42	A	0.415	2.035	6	1	1	52.171	1.66	82.93	C
140.00-120.00			B	0.415	2.035		1	1	52.171			
			C	0.415	2.035		1	1	52.171			
T5	7.89	6.70	A	0.361	2.145	6	1	1	55.917	1.67	83.51	C
120.00-100.00			B	0.361	2.145		1	1	55.917			
			C	0.361	2.145		1	1	55.917			
T6	7.79	5.96	A	0.267	2.387	5	1	1	46.876	1.54	76.84	C
100.00-80.00			B	0.267	2.387		1	1	46.876			
			C	0.267	2.387		1	1	46.876			
T7	7.67	14.29	A	0.476	1.934	5	1	1	111.689	1.73	86.65	C
80.00-60.00			B	0.476	1.934		1	1	111.689			
			C	0.476	1.934		1	1	111.689			
T8	7.51	8.44	A	0.246	2.449	4	1	1	58.913	1.41	70.47	C
60.00-40.00			B	0.246	2.449		1	1	58.913			
			C	0.246	2.449		1	1	58.913			
T9	7.29	9.26	A	0.26	2.407	4	1	1	71.113	1.30	64.85	C
40.00-20.00			B	0.26	2.407		1	1	71.113			
			C	0.26	2.407		1	1	71.113			
T10	6.86	14.21	A	0.332	2.215	4	1	1	106.534	1.49	74.50	C
20.00-0.00			B	0.332	2.215		1	1	106.534			
			C	0.332	2.215		1	1	106.534			
Sum Weight:	64.53	71.68			*2.1A_g limit			OTM	1207.63 kip-ft	13.44		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.63	0.81	A	0.468	1.944	6	0.8	1	8.977	0.21	42.83	C
185.00-180.00			B	0.468	1.944		0.8	1	8.977			
			C	0.468	1.944		0.8	1	8.977			
T2	3.57	3.09	A	0.438	1.994	6	0.8	1	33.088	1.00	49.87	C
180.00-160.00			B	0.438	1.994		0.8	1	33.088			
			C	0.438	1.994		0.8	1	33.088			
T3	7.35	3.50	A	0.39	2.085	6	0.8	1	33.983	1.41*	70.37	C
160.00-140.00			B	0.39	2.085		0.8	1	33.983			
			C	0.39	2.085		0.8	1	33.983			
T4	7.97	5.42	A	0.415	2.035	6	0.8	1	48.734	1.62	81.21	C
140.00-120.00			B	0.415	2.035		0.8	1	48.734			
			C	0.415	2.035		0.8	1	48.734			
T5	7.89	6.70	A	0.361	2.145	6	0.8	1	51.853	1.63	81.46	C
120.00-100.00			B	0.361	2.145		0.8	1	51.853			
			C	0.361	2.145		0.8	1	51.853			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T6	7.79	5.96	A	0.267	2.387	5	0.8	1	43.576	1.50	75.09	C
100.00-80.00			B	0.267	2.387		0.8	1	43.576			
			C	0.267	2.387		0.8	1	43.576			
T7	7.67	14.29	A	0.476	1.934	5	0.8	1	101.026	1.65	82.39	C
80.00-60.00			B	0.476	1.934		0.8	1	101.026			
			C	0.476	1.934		0.8	1	101.026			
T8	7.51	8.44	A	0.246	2.449	4	0.8	1	53.696	1.36	68.07	C
60.00-40.00			B	0.246	2.449		0.8	1	53.696			
			C	0.246	2.449		0.8	1	53.696			
T9	7.29	9.26	A	0.26	2.407	4	0.8	1	64.755	1.25	62.37	C
40.00-20.00			B	0.26	2.407		0.8	1	64.755			
			C	0.26	2.407		0.8	1	64.755			
T10	6.86	14.21	A	0.332	2.215	4	0.8	1	95.322	1.41	70.48	C
20.00-0.00			B	0.332	2.215		0.8	1	95.322			
			C	0.332	2.215		0.8	1	95.322			
Sum Weight:	64.53	71.68			*2.1A_g limit			OTM	1180.24 kip-ft	13.04		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.63	0.81	A	0.468	1.944	6	0.85	1	9.119	0.22	43.13	C
185.00-180.00			B	0.468	1.944		0.85	1	9.119			
			C	0.468	1.944		0.85	1	9.119			
T2	3.57	3.09	A	0.438	1.994	6	0.85	1	33.577	1.00	50.13	C
180.00-160.00			B	0.438	1.994		0.85	1	33.577			
			C	0.438	1.994		0.85	1	33.577			
T3	7.35	3.50	A	0.39	2.085	6	0.85	1	34.523	1.41*	70.37	C
160.00-140.00			B	0.39	2.085		0.85	1	34.523			
			C	0.39	2.085		0.85	1	34.523			
T4	7.97	5.42	A	0.415	2.035	6	0.85	1	49.593	1.63	81.64	C
140.00-120.00			B	0.415	2.035		0.85	1	49.593			
			C	0.415	2.035		0.85	1	49.593			
T5	7.89	6.70	A	0.361	2.145	6	0.85	1	52.869	1.64	81.98	C
120.00-100.00			B	0.361	2.145		0.85	1	52.869			
			C	0.361	2.145		0.85	1	52.869			
T6	7.79	5.96	A	0.267	2.387	5	0.85	1	44.401	1.51	75.53	C
100.00-80.00			B	0.267	2.387		0.85	1	44.401			
			C	0.267	2.387		0.85	1	44.401			
T7	7.67	14.29	A	0.476	1.934	5	0.85	1	103.692	1.67	83.45	C
80.00-60.00			B	0.476	1.934		0.85	1	103.692			
			C	0.476	1.934		0.85	1	103.692			
T8	7.51	8.44	A	0.246	2.449	4	0.85	1	55.000	1.37	68.67	C
60.00-40.00			B	0.246	2.449		0.85	1	55.000			
			C	0.246	2.449		0.85	1	55.000			
T9	7.29	9.26	A	0.26	2.407	4	0.85	1	66.345	1.26	62.99	C
40.00-20.00			B	0.26	2.407		0.85	1	66.345			
			C	0.26	2.407		0.85	1	66.345			
T10	6.86	14.21	A	0.332	2.215	4	0.85	1	98.125	1.43	71.49	C
20.00-0.00			B	0.332	2.215		0.85	1	98.125			
			C	0.332	2.215		0.85	1	98.125			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	64.53	71.68			*2.1A_g limit			OTM	1187.09 kip-ft	13.14		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	0.14	A	0.186	2.644	9	1	1	3.983	0.15	30.06	C
185.00-180.00			B	0.186	2.644		1	1	3.983			
			C	0.186	2.644		1	1	3.983			
T2	0.46	0.65	A	0.185	2.647	9	1	1	15.268	0.70	35.10	C
180.00-160.00			B	0.185	2.647		1	1	15.268			
			C	0.185	2.647		1	1	15.268			
T3	0.97	0.94	A	0.163	2.723	9	1	1	16.265	1.17	58.39	C
160.00-140.00			B	0.163	2.723		1	1	16.265			
			C	0.163	2.723		1	1	16.265			
T4	1.06	1.61	A	0.183	2.653	8	1	1	24.822	1.35	67.57	C
140.00-120.00			B	0.183	2.653		1	1	24.822			
			C	0.183	2.653		1	1	24.822			
T5	1.06	2.48	A	0.186	2.644	8	1	1	30.054	1.38	69.02	C
120.00-100.00			B	0.186	2.644		1	1	30.054			
			C	0.186	2.644		1	1	30.054			
T6	1.06	2.48	A	0.141	2.806	8	1	1	26.121	1.26	63.21	C
100.00-80.00			B	0.141	2.806		1	1	26.121			
			C	0.141	2.806		1	1	26.121			
T7	1.06	5.68	A	0.249	2.442	7	1	1	63.616	1.66	83.21	C
80.00-60.00			B	0.249	2.442		1	1	63.616			
			C	0.249	2.442		1	1	63.616			
T8	1.06	4.05	A	0.136	2.825	6	1	1	35.991	1.22	61.10	C
60.00-40.00			B	0.136	2.825		1	1	35.991			
			C	0.136	2.825		1	1	35.991			
T9	1.06	4.15	A	0.162	2.728	5	1	1	45.064	1.16	57.76	C
40.00-20.00			B	0.162	2.728		1	1	45.064			
			C	0.162	2.728		1	1	45.064			
T10	1.06	6.97	A	0.205	2.58	5	1	1	69.899	1.42	71.09	C
20.00-0.00			B	0.205	2.58		1	1	69.899			
			C	0.205	2.58		1	1	69.899			
Sum Weight:	8.91	29.14						OTM	989.70 kip-ft	11.48		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	0.14	A	0.186	2.644	9	0.8	1	3.413	0.14	27.70	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
185.00-180.00			B	0.186	2.644		0.8	1	3.413			
			C	0.186	2.644		0.8	1	3.413			
T2	0.46	0.65	A	0.185	2.647	9	0.8	1	13.311	0.66	33.12	C
180.00-160.00			B	0.185	2.647		0.8	1	13.311			
			C	0.185	2.647		0.8	1	13.311			
T3	0.97	0.94	A	0.163	2.723	9	0.8	1	14.104	1.12	56.21	C
160.00-140.00			B	0.163	2.723		0.8	1	14.104			
			C	0.163	2.723		0.8	1	14.104			
T4	1.06	1.61	A	0.183	2.653	8	0.8	1	21.385	1.29	64.34	C
140.00-120.00			B	0.183	2.653		0.8	1	21.385			
			C	0.183	2.653		0.8	1	21.385			
T5	1.06	2.48	A	0.186	2.644	8	0.8	1	25.990	1.31	65.39	C
120.00-100.00			B	0.186	2.644		0.8	1	25.990			
			C	0.186	2.644		0.8	1	25.990			
T6	1.06	2.48	A	0.141	2.806	8	0.8	1	22.821	1.21	60.25	C
100.00-80.00			B	0.141	2.806		0.8	1	22.821			
			C	0.141	2.806		0.8	1	22.821			
T7	1.06	5.68	A	0.249	2.442	7	0.8	1	52.953	1.51	75.47	C
80.00-60.00			B	0.249	2.442		0.8	1	52.953			
			C	0.249	2.442		0.8	1	52.953			
T8	1.06	4.05	A	0.136	2.825	6	0.8	1	30.774	1.14	57.12	C
60.00-40.00			B	0.136	2.825		0.8	1	30.774			
			C	0.136	2.825		0.8	1	30.774			
T9	1.06	4.15	A	0.162	2.728	5	0.8	1	38.707	1.07	53.72	C
40.00-20.00			B	0.162	2.728		0.8	1	38.707			
			C	0.162	2.728		0.8	1	38.707			
T10	1.06	6.97	A	0.205	2.58	5	0.8	1	58.687	1.29	64.35	C
20.00-0.00			B	0.205	2.58		0.8	1	58.687			
			C	0.205	2.58		0.8	1	58.687			
Sum Weight:	8.91	29.14						OTM	933.98 kip-ft	10.74		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	0.14	A	0.186	2.644	9	0.85	1	3.555	0.14	28.29	C
185.00-180.00			B	0.186	2.644		0.85	1	3.555			
			C	0.186	2.644		0.85	1	3.555			
T2	0.46	0.65	A	0.185	2.647	9	0.85	1	13.800	0.67	33.61	C
180.00-160.00			B	0.185	2.647		0.85	1	13.800			
			C	0.185	2.647		0.85	1	13.800			
T3	0.97	0.94	A	0.163	2.723	9	0.85	1	14.644	1.14	56.76	C
160.00-140.00			B	0.163	2.723		0.85	1	14.644			
			C	0.163	2.723		0.85	1	14.644			
T4	1.06	1.61	A	0.183	2.653	8	0.85	1	22.244	1.30	65.15	C
140.00-120.00			B	0.183	2.653		0.85	1	22.244			
			C	0.183	2.653		0.85	1	22.244			
T5	1.06	2.48	A	0.186	2.644	8	0.85	1	27.006	1.33	66.30	C
120.00-100.00			B	0.186	2.644		0.85	1	27.006			
			C	0.186	2.644		0.85	1	27.006			
T6	1.06	2.48	A	0.141	2.806	8	0.85	1	23.646	1.22	60.99	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
100.00-80.00			B	0.141	2.806		0.85	1	23.646			
			C	0.141	2.806		0.85	1	23.646			
T7	1.06	5.68	A	0.249	2.442	7	0.85	1	55.619	1.55	77.41	C
80.00-60.00			B	0.249	2.442		0.85	1	55.619			
			C	0.249	2.442		0.85	1	55.619			
T8	1.06	4.05	A	0.136	2.825	6	0.85	1	32.078	1.16	58.11	C
60.00-40.00			B	0.136	2.825		0.85	1	32.078			
			C	0.136	2.825		0.85	1	32.078			
T9	1.06	4.15	A	0.162	2.728	5	0.85	1	40.296	1.09	54.73	C
40.00-20.00			B	0.162	2.728		0.85	1	40.296			
			C	0.162	2.728		0.85	1	40.296			
T10	1.06	6.97	A	0.205	2.58	5	0.85	1	61.490	1.32	66.03	C
20.00-0.00			B	0.205	2.58		0.85	1	61.490			
			C	0.205	2.58		0.85	1	61.490			
Sum Weight:	8.91	29.14						OTM	947.91 kip-ft	10.92		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	10.20					
Bracing Weight	18.94					
Total Member Self-Weight	29.14			-15.05	0.52	
Total Weight	46.70			-15.05	0.52	
Wind 0 deg - No Ice		-0.12	-34.48	-3552.53	15.90	-0.14
Wind 30 deg - No Ice		16.56	-28.65	-2984.80	-1717.64	-13.88
Wind 60 deg - No Ice		28.30	-16.34	-1716.76	-2944.95	-23.88
Wind 90 deg - No Ice		33.11	-0.03	-20.94	-3432.65	-27.53
Wind 120 deg - No Ice		29.83	17.20	1748.05	-3059.06	-23.99
Wind 150 deg - No Ice		16.53	28.66	2955.31	-1710.96	-14.02
Wind 180 deg - No Ice		-0.02	32.64	3381.64	4.40	-0.11
Wind 210 deg - No Ice		-16.56	28.65	2954.90	1718.34	13.88
Wind 240 deg - No Ice		-29.95	17.13	1740.37	3077.56	24.12
Wind 270 deg - No Ice		-33.17	-0.06	-21.94	3441.56	27.90
Wind 300 deg - No Ice		-28.34	-16.34	-1715.42	2951.43	23.99
Wind 330 deg - No Ice		-16.63	-28.66	-2985.84	1727.01	13.64
Member Ice	42.54					
Total Weight Ice	161.05			-111.13	-10.13	
Wind 0 deg - Ice		-0.04	-16.82	-1885.32	-4.52	7.66
Wind 30 deg - Ice		8.25	-14.28	-1627.32	-886.64	2.26
Wind 60 deg - Ice		14.21	-8.20	-984.24	-1522.14	-3.75
Wind 90 deg - Ice		16.51	-0.01	-112.87	-1762.57	-8.78
Wind 120 deg - Ice		14.56	8.40	774.27	-1545.53	-11.50
Wind 150 deg - Ice		8.24	14.29	1405.56	-884.84	-11.16
Wind 180 deg - Ice		-0.01	16.40	1633.27	-9.08	-7.76
Wind 210 deg - Ice		-8.25	14.28	1405.12	866.27	-2.26
Wind 240 deg - Ice		-14.60	8.37	771.11	1531.01	3.84
Wind 270 deg - Ice		-16.53	-0.02	-113.81	1745.04	8.90
Wind 300 deg - Ice		-14.23	-8.21	-984.29	1504.06	11.51
Wind 330 deg - Ice		-8.28	-14.29	-1627.97	869.77	11.03
Total Weight	46.70			-15.05	0.52	

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 0 deg - Service		-0.05	-14.35	-1472.95	7.27	-0.06
Wind 30 deg - Service		6.89	-11.92	-1236.64	-714.29	-5.78
Wind 60 deg - Service		11.78	-6.80	-708.84	-1225.13	-9.94
Wind 90 deg - Service		13.78	-0.01	-2.99	-1428.13	-11.46
Wind 120 deg - Service		12.42	7.16	733.33	-1272.63	-9.98
Wind 150 deg - Service		6.88	11.93	1235.83	-711.51	-5.83
Wind 180 deg - Service		-0.01	13.59	1413.28	2.49	-0.04
Wind 210 deg - Service		-6.89	11.92	1235.66	715.88	5.78
Wind 240 deg - Service		-12.47	7.13	730.13	1281.63	10.04
Wind 270 deg - Service		-13.81	-0.02	-3.40	1433.14	11.61
Wind 300 deg - Service		-11.80	-6.80	-708.28	1229.14	9.98
Wind 330 deg - Service		-6.92	-11.93	-1237.07	719.49	5.68

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service

Comb. No.	Description
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	185 - 180	Leg	Max Tension	23	3.15	-0.39	-0.25
			Max. Compression	2	-5.33	0.02	0.44
			Max. Mx	20	-1.20	0.58	-0.00
			Max. My	14	-1.21	-0.01	-0.55
			Max. Vy	18	-1.56	0.37	-0.23
			Max. Vx	2	-1.86	0.02	0.44
		Diagonal	Max Tension	17	1.81	0.00	0.00
			Max. Compression	4	-1.94	0.00	0.00
			Max. Mx	37	0.37	0.01	-0.00
			Max. My	4	-1.93	0.00	0.00
			Max. Vy	37	-0.02	0.01	-0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	10	0.98	0.00	0.00
			Max. Compression	15	-0.88	0.00	0.00
			Max. Mx	27	0.38	-0.04	0.00
			Max. My	20	0.05	0.00	0.00
			Max. Vy	27	0.03	0.00	0.00
			Max. Vx	20	-0.00	0.00	0.00
T2	180 - 160	Leg	Max Tension	7	28.39	-0.29	0.16
			Max. Compression	2	-33.75	0.00	0.37
			Max. Mx	20	-28.48	-0.49	0.05
			Max. My	2	-33.75	0.00	-0.50
			Max. Vy	8	-0.83	-0.39	-0.01
			Max. Vx	2	0.85	0.01	0.38
		Diagonal	Max Tension	12	5.19	0.00	0.00
			Max. Compression	24	-5.36	0.00	0.00
			Max. Mx	31	1.21	0.03	0.00
			Max. My	10	-4.78	-0.00	0.01
			Max. Vy	31	-0.02	0.03	0.00
			Max. Vx	10	-0.00	0.00	0.00
		Top Girt	Max Tension	6	0.20	0.00	0.00
			Max. Compression	3	-0.12	0.00	0.00
			Max. Mx	27	0.03	-0.04	0.00
			Max. My	20	0.03	0.00	0.00
			Max. Vy	27	0.03	0.00	0.00
			Max. Vx	20	-0.00	0.00	0.00
T3	160 - 140	Leg	Max Tension	7	67.76	-0.02	0.01
			Max. Compression	2	-77.28	0.11	-0.00
			Max. Mx	18	-55.94	0.39	-0.03
			Max. My	8	-3.79	-0.03	-0.37
			Max. Vy	14	0.68	-0.39	-0.00
			Max. Vx	20	0.62	0.00	-0.24

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	16	5.17	0.00	0.00
			Max. Compression	16	-5.24	0.00	0.00
			Max. Mx	27	1.51	0.03	0.00
			Max. My	24	-4.23	-0.01	-0.01
			Max. Vy	27	-0.03	0.03	0.00
			Max. Vx	24	0.00	0.00	0.00
		Top Girt	Max Tension	7	0.13	0.00	0.00
			Max. Compression	18	-0.20	0.00	0.00
			Max. Mx	27	-0.11	-0.04	0.00
			Max. My	37	-0.08	0.00	0.00
			Max. Vy	27	0.03	0.00	0.00
			Max. Vx	37	-0.00	0.00	0.00
T4	140 - 120	Leg	Max Tension	7	104.52	0.51	0.01
			Max. Compression	2	-116.90	1.27	0.00
			Max. Mx	2	-116.83	1.27	0.00
			Max. My	20	-6.10	-0.11	-1.29
			Max. Vy	2	0.82	1.27	0.00
			Max. Vx	20	0.61	-0.11	-1.29
		Diagonal	Max Tension	13	5.68	0.02	0.00
			Max. Compression	12	-5.87	0.00	0.00
			Max. Mx	27	1.38	0.04	0.00
			Max. My	10	-5.59	-0.01	0.01
			Max. Vy	29	0.04	0.04	0.00
			Max. Vx	37	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	2	2.03	0.00	0.00
			Max. Compression	2	-2.03	0.00	-0.00
			Max. Mx	33	-0.00	0.03	0.01
			Max. My	28	-0.13	0.03	0.01
			Max. Vy	33	-0.04	0.03	0.01
			Max. Vx	27	-0.00	0.00	0.00
T5	120 - 100	Leg	Max Tension	7	136.11	1.41	0.03
			Max. Compression	2	-151.95	-0.47	-0.00
			Max. Mx	2	-139.69	2.95	0.00
			Max. My	20	-6.53	-0.20	-1.56
			Max. Vy	2	-1.50	2.95	0.00
			Max. Vx	20	-0.65	-0.20	-1.56
		Diagonal	Max Tension	23	6.78	0.07	-0.01
			Max. Compression	10	-7.27	0.00	0.00
			Max. Mx	27	1.35	0.10	0.01
			Max. My	18	-7.08	-0.04	-0.02
			Max. Vy	27	-0.06	0.10	0.01
			Max. Vx	18	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	2	2.64	0.00	0.00
			Max. Compression	2	-2.64	0.02	-0.01
			Max. Mx	31	-0.06	0.06	0.01
			Max. My	20	-1.50	0.03	0.02
			Max. Vy	31	-0.06	0.06	0.01
			Max. Vx	8	-0.01	0.00	0.00
T6	100 - 80	Leg	Max Tension	23	168.55	-0.99	-0.06
			Max. Compression	2	-188.42	-1.37	-0.00
			Max. Mx	2	-188.42	-1.37	-0.00
			Max. My	20	-8.20	-0.11	-1.08
			Max. Vy	18	0.40	0.98	-0.05
			Max. Vx	20	-0.20	-0.11	-1.08
		Diagonal	Max Tension	12	7.32	0.00	0.00
			Max. Compression	12	-7.49	0.00	0.00
			Max. Mx	27	1.68	0.11	-0.01
			Max. My	31	-0.34	0.10	0.01
			Max. Vy	29	0.07	0.11	-0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	31	-0.00	0.00	0.00
T7	80 - 60	Leg	Max Tension	23	197.72	0.88	0.00
			Max. Compression	2	-223.63	1.91	0.01
			Max. Mx	2	-221.85	5.60	-0.01
			Max. My	20	-12.21	-0.26	-2.61
			Max. Vy	2	-5.80	5.60	-0.01
			Max. Vx	20	2.15	-0.26	-2.61
		Diagonal	Max Tension	23	8.95	0.02	0.00
			Max. Compression	18	-9.95	0.00	0.00
			Max. Mx	18	4.20	0.12	0.00
			Max. My	33	-2.62	0.02	0.01
			Max. Vy	27	-0.05	0.08	0.01
			Max. Vx	28	-0.00	0.00	0.00
		Horizontal	Max Tension	2	3.88	0.00	0.00
			Max. Compression	2	-3.88	0.05	0.02
			Max. Mx	35	-0.12	0.13	0.06
			Max. My	27	-0.14	0.12	0.07
			Max. Vy	27	-0.09	0.12	0.07
			Max. Vx	27	-0.01	0.00	0.00
		Redund Horz 1 Bracing	Max Tension	18	5.81	0.00	0.00
			Max. Compression	23	-5.36	0.00	0.00
			Max. Mx	35	0.12	-0.04	0.00
			Max. My	30	2.19	0.00	0.00
			Max. Vy	35	0.04	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	23	3.00	0.00	0.00
			Max. Compression	18	-3.44	0.00	0.00
			Max. Mx	28	0.31	-0.04	0.00
			Max. My	27	-0.18	0.00	0.00
			Max. Vy	28	0.04	0.00	0.00
			Max. Vx	27	-0.00	0.00	0.00
T8	60 - 40	Leg	Max Tension	23	225.43	1.76	-0.04
			Max. Compression	2	-256.23	-2.70	-0.01
			Max. Mx	2	-256.07	3.49	0.00
			Max. My	20	-12.80	-0.26	-2.61
			Max. Vy	2	1.23	3.49	0.00
			Max. Vx	20	-0.75	-0.26	-2.61
		Diagonal	Max Tension	13	9.55	0.12	-0.00
			Max. Compression	10	-10.04	0.00	0.00
			Max. Mx	27	2.60	0.22	0.02
			Max. My	10	-9.99	0.01	0.03
			Max. Vy	29	0.10	0.21	-0.02
			Max. Vx	38	-0.01	0.00	0.00
		Secondary Horizontal	Max Tension	2	4.44	0.00	0.00
			Max. Compression	2	-4.44	0.09	-0.00
			Max. Mx	36	0.83	0.17	0.03
			Max. My	28	-0.16	0.17	0.04
			Max. Vy	30	-0.11	0.17	0.03
			Max. Vx	38	-0.01	0.00	0.00
T9	40 - 20	Leg	Max Tension	23	253.30	3.22	-0.04
			Max. Compression	2	-289.19	-7.31	-0.01
			Max. Mx	2	-288.96	7.65	0.00
			Max. My	20	-15.48	-0.57	-3.77
			Max. Vy	2	2.95	7.65	0.00
			Max. Vx	20	-0.87	-0.57	-3.77
		Diagonal	Max Tension	13	10.71	0.12	-0.00
			Max. Compression	18	-11.87	0.00	0.00
			Max. Mx	27	1.56	0.24	0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	38	0.70	0.23	-0.03
			Max. Vy	29	0.11	0.23	-0.02
			Max. Vx	38	0.01	0.00	0.00
		Secondary Horizontal	Max Tension	2	5.02	0.00	0.00
			Max. Compression	2	-5.02	0.12	0.00
			Max. Mx	32	-0.04	0.23	0.04
			Max. My	28	-0.47	0.22	0.04
			Max. Vy	31	-0.12	0.21	0.03
			Max. Vx	38	-0.01	0.00	0.00
T10	20 - 0	Leg	Max Tension	23	279.39	1.44	0.03
			Max. Compression	2	-322.94	5.15	-0.00
			Max. Mx	2	-303.85	11.93	-0.01
			Max. My	20	-17.97	-1.15	-4.99
			Max. Vy	2	-9.13	11.64	-0.01
			Max. Vx	20	2.55	-1.15	-4.99
		Diagonal	Max Tension	23	11.95	0.07	0.01
			Max. Compression	18	-13.65	0.00	0.00
			Max. Mx	18	4.77	0.19	0.01
			Max. My	32	-5.39	0.03	0.02
			Max. Vy	27	-0.07	0.14	0.02
			Max. Vx	32	0.00	0.00	0.00
		Horizontal	Max Tension	2	5.60	0.00	0.00
			Max. Compression	2	-5.60	0.19	0.07
			Max. Mx	27	-0.68	0.34	0.13
			Max. My	27	0.09	0.34	0.13
			Max. Vy	27	-0.15	0.34	0.13
			Max. Vx	27	-0.02	0.00	0.00
		Redund Horz 1 Bracing	Max Tension	18	8.56	0.00	0.00
			Max. Compression	23	-7.50	0.00	0.00
			Max. Mx	34	2.49	-0.07	0.00
			Max. My	27	3.00	0.00	0.00
			Max. Vy	34	0.05	0.00	0.00
			Max. Vx	27	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	23	4.23	0.00	0.00
			Max. Compression	18	-5.08	0.00	0.00
			Max. Mx	38	0.81	-0.08	0.00
			Max. My	31	0.22	0.00	-0.00
			Max. Vy	38	0.05	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	331.96	30.58	-18.88
	Max. H_x	18	331.96	30.58	-18.88
	Max. H_z	7	-287.12	-26.48	16.52
	Min. Vert	7	-287.12	-26.48	16.52
	Min. H_x	7	-287.12	-26.48	16.52
	Min. H_z	18	331.96	30.58	-18.88
Leg B	Max. Vert	10	330.90	-30.52	-18.83
	Max. H_x	23	-287.52	26.51	16.54
	Max. H_z	23	-287.52	26.51	16.54

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg A	Min. Vert	23	-287.52	26.51	16.54
	Min. H_x	10	330.90	-30.52	-18.83
	Min. H_z	10	330.90	-30.52	-18.83
	Max. Vert	2	332.98	-0.00	35.92
	Max. H_x	21	15.38	3.67	1.38
	Max. H_z	2	332.98	-0.00	35.92
	Min. Vert	15	-285.58	-0.01	-31.13
	Min. H_x	9	15.29	-3.66	1.36
	Min. H_z	15	-285.58	-0.01	-31.13

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	46.70	0.00	0.00	-15.05	0.52	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	56.04	-0.19	-55.16	-5715.98	25.38	-0.23
0.9 Dead+1.6 Wind 0 deg - No Ice	42.03	-0.19	-55.16	-5701.81	25.19	-0.23
1.2 Dead+1.6 Wind 30 deg - No Ice	56.04	26.50	-45.83	-4801.79	-2766.88	-22.27
0.9 Dead+1.6 Wind 30 deg - No Ice	42.03	26.50	-45.83	-4789.11	-2762.33	-22.25
1.2 Dead+1.6 Wind 60 deg - No Ice	56.04	45.27	-26.14	-2759.42	-4743.85	-38.32
0.9 Dead+1.6 Wind 60 deg - No Ice	42.03	45.27	-26.14	-2750.19	-4735.93	-38.29
1.2 Dead+1.6 Wind 90 deg - No Ice	56.04	52.98	-0.06	-27.88	-5529.41	-44.19
0.9 Dead+1.6 Wind 90 deg - No Ice	42.03	52.98	-0.06	-23.29	-5520.18	-44.16
1.2 Dead+1.6 Wind 120 deg - No Ice	56.04	47.73	27.53	2821.49	-4927.51	-38.50
0.9 Dead+1.6 Wind 120 deg - No Ice	42.03	47.73	27.53	2821.27	-4919.35	-38.47
1.2 Dead+1.6 Wind 150 deg - No Ice	56.04	26.44	45.85	4766.33	-2756.23	-22.48
0.9 Dead+1.6 Wind 150 deg - No Ice	42.03	26.44	45.85	4762.78	-2751.72	-22.46
1.2 Dead+1.6 Wind 180 deg - No Ice	56.04	-0.03	52.23	5453.19	6.90	-0.16
0.9 Dead+1.6 Wind 180 deg - No Ice	42.03	-0.03	52.23	5448.44	6.72	-0.17
1.2 Dead+1.6 Wind 210 deg - No Ice	56.04	-26.49	45.84	4765.69	2767.72	22.26
0.9 Dead+1.6 Wind 210 deg - No Ice	42.03	-26.49	45.84	4762.13	2762.86	22.25
1.2 Dead+1.6 Wind 240 deg - No Ice	56.04	-47.92	27.42	2809.15	4956.90	38.72
0.9 Dead+1.6 Wind 240 deg - No Ice	42.03	-47.92	27.42	2808.94	4948.37	38.69
1.2 Dead+1.6 Wind 270 deg - No Ice	56.04	-53.07	-0.09	-29.45	5543.35	44.79
0.9 Dead+1.6 Wind 270 deg - No Ice	42.03	-53.07	-0.09	-24.87	5533.78	44.76
1.2 Dead+1.6 Wind 300 deg -	56.04	-45.35	-26.15	-2757.23	4753.85	38.50

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
No Ice 0.9 Dead+1.6 Wind 300 deg - No Ice	42.03	-45.35	-26.15	-2748.01	4745.61	38.47
1.2 Dead+1.6 Wind 330 deg - No Ice	56.04	-26.62	-45.86	-4803.46	2781.51	21.88
0.9 Dead+1.6 Wind 330 deg - No Ice	42.03	-26.62	-45.86	-4790.77	2776.63	21.87
1.2 Dead+1.0 Ice+1.0 Temp	170.39	-0.00	0.00	-116.48	-10.35	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	170.39	-0.04	-16.82	-1930.58	-4.64	7.70
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	170.39	8.25	-14.28	-1666.89	-906.64	2.15
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	170.39	14.21	-8.20	-1009.36	-1556.50	-3.98
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	170.39	16.51	-0.01	-118.34	-1802.32	-9.07
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	170.39	14.56	8.40	788.74	-1580.28	-11.77
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	170.39	8.24	14.29	1434.33	-904.82	-11.34
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	170.39	-0.01	16.40	1667.23	-9.31	-7.80
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	170.39	-8.25	14.28	1433.90	885.78	-2.15
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	170.39	-14.60	8.37	785.52	1565.40	4.07
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	170.39	-16.53	-0.02	-119.28	1784.37	9.20
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	170.39	-14.23	-8.21	-1009.40	1537.99	11.78
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	170.39	-8.28	-14.29	-1667.57	889.36	11.21
Dead+Wind 0 deg - Service	46.70	-0.05	-14.35	-1495.79	6.96	-0.06
Dead+Wind 30 deg - Service	46.70	6.89	-11.92	-1258.21	-718.64	-5.79
Dead+Wind 60 deg - Service	46.70	11.78	-6.80	-727.46	-1232.41	-9.97
Dead+Wind 90 deg - Service	46.70	13.78	-0.01	-17.61	-1436.54	-11.49
Dead+Wind 120 deg - Service	46.70	12.42	7.16	722.82	-1280.11	-10.01
Dead+Wind 150 deg - Service	46.70	6.88	11.93	1228.20	-715.87	-5.85
Dead+Wind 180 deg - Service	46.70	-0.01	13.59	1406.69	2.15	-0.04
Dead+Wind 210 deg - Service	46.70	-6.89	11.92	1228.03	719.58	5.79
Dead+Wind 240 deg - Service	46.70	-12.47	7.13	719.61	1288.47	10.07
Dead+Wind 270 deg - Service	46.70	-13.81	-0.02	-18.02	1440.88	11.64
Dead+Wind 300 deg - Service	46.70	-11.80	-6.80	-726.89	1235.73	10.01
Dead+Wind 330 deg - Service	46.70	-6.92	-11.93	-1258.64	723.17	5.69

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-46.70	0.00	0.00	46.70	0.00	0.000%
2	-0.19	-56.04	-55.16	0.19	56.04	55.16	0.000%
3	-0.19	-42.03	-55.16	0.19	42.03	55.16	0.000%
4	26.50	-56.04	-45.83	-26.50	56.04	45.83	0.000%
5	26.50	-42.03	-45.83	-26.50	42.03	45.83	0.000%
6	45.27	-56.04	-26.14	-45.27	56.04	26.14	0.000%
7	45.27	-42.03	-26.14	-45.27	42.03	26.14	0.000%
8	52.98	-56.04	-0.06	-52.98	56.04	0.06	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
9	52.98	-42.03	-0.06	-52.98	42.03	0.06	0.000%
10	47.73	-56.04	27.53	-47.73	56.04	-27.53	0.000%
11	47.73	-42.03	27.53	-47.73	42.03	-27.53	0.000%
12	26.44	-56.04	45.85	-26.44	56.04	-45.85	0.000%
13	26.44	-42.03	45.85	-26.44	42.03	-45.85	0.000%
14	-0.03	-56.04	52.23	0.03	56.04	-52.23	0.000%
15	-0.03	-42.03	52.23	0.03	42.03	-52.23	0.000%
16	-26.49	-56.04	45.84	26.49	56.04	-45.84	0.000%
17	-26.49	-42.03	45.84	26.49	42.03	-45.84	0.000%
18	-47.92	-56.04	27.42	47.92	56.04	-27.42	0.000%
19	-47.92	-42.03	27.42	47.92	42.03	-27.42	0.000%
20	-53.07	-56.04	-0.09	53.07	56.04	0.09	0.000%
21	-53.07	-42.03	-0.09	53.07	42.03	0.09	0.000%
22	-45.35	-56.04	-26.15	45.35	56.04	26.15	0.000%
23	-45.35	-42.03	-26.15	45.35	42.03	26.15	0.000%
24	-26.62	-56.04	-45.86	26.62	56.04	45.86	0.000%
25	-26.62	-42.03	-45.86	26.62	42.03	45.86	0.000%
26	0.00	-170.39	0.00	0.00	170.39	-0.00	0.000%
27	-0.04	-170.39	-16.82	0.04	170.39	16.82	0.000%
28	8.25	-170.39	-14.28	-8.25	170.39	14.28	0.000%
29	14.21	-170.39	-8.20	-14.21	170.39	8.20	0.000%
30	16.51	-170.39	-0.01	-16.51	170.39	0.01	0.000%
31	14.56	-170.39	8.40	-14.56	170.39	-8.40	0.000%
32	8.24	-170.39	14.29	-8.24	170.39	-14.29	0.000%
33	-0.01	-170.39	16.40	0.01	170.39	-16.40	0.000%
34	-8.25	-170.39	14.28	8.25	170.39	-14.28	0.000%
35	-14.60	-170.39	8.37	14.60	170.39	-8.37	0.000%
36	-16.53	-170.39	-0.02	16.53	170.39	0.02	0.000%
37	-14.23	-170.39	-8.21	14.23	170.39	8.21	0.000%
38	-8.28	-170.39	-14.29	8.28	170.39	14.29	0.000%
39	-0.05	-46.70	-14.35	0.05	46.70	14.35	0.000%
40	6.89	-46.70	-11.92	-6.89	46.70	11.92	0.000%
41	11.78	-46.70	-6.80	-11.78	46.70	6.80	0.000%
42	13.78	-46.70	-0.01	-13.78	46.70	0.01	0.000%
43	12.42	-46.70	7.16	-12.42	46.70	-7.16	0.000%
44	6.88	-46.70	11.93	-6.88	46.70	-11.93	0.000%
45	-0.01	-46.70	13.59	0.01	46.70	-13.59	0.000%
46	-6.89	-46.70	11.92	6.89	46.70	-11.92	0.000%
47	-12.47	-46.70	7.13	12.47	46.70	-7.13	0.000%
48	-13.81	-46.70	-0.02	13.81	46.70	0.02	0.000%
49	-11.80	-46.70	-6.80	11.80	46.70	6.80	0.000%
50	-6.92	-46.70	-11.93	6.92	46.70	11.93	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000074
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000104
5	Yes	4	0.00000001	0.00000068
6	Yes	4	0.00000001	0.00000116
7	Yes	4	0.00000001	0.00000071
8	Yes	4	0.00000001	0.00000132
9	Yes	4	0.00000001	0.00000098

10	Yes	4	0.00000001	0.00000083
11	Yes	4	0.00000001	0.00000047
12	Yes	4	0.00000001	0.00000105
13	Yes	4	0.00000001	0.00000067
14	Yes	4	0.00000001	0.00000115
15	Yes	4	0.00000001	0.00000067
16	Yes	4	0.00000001	0.00000104
17	Yes	4	0.00000001	0.00000067
18	Yes	4	0.00000001	0.00000083
19	Yes	4	0.00000001	0.00000048
20	Yes	4	0.00000001	0.00000133
21	Yes	4	0.00000001	0.00000099
22	Yes	4	0.00000001	0.00000116
23	Yes	4	0.00000001	0.00000071
24	Yes	4	0.00000001	0.00000105
25	Yes	4	0.00000001	0.00000069
26	Yes	4	0.00000001	0.00000382
27	Yes	4	0.00000001	0.00003682
28	Yes	4	0.00000001	0.00003693
29	Yes	4	0.00000001	0.00003695
30	Yes	4	0.00000001	0.00003652
31	Yes	4	0.00000001	0.00003595
32	Yes	4	0.00000001	0.00003561
33	Yes	4	0.00000001	0.00003551
34	Yes	4	0.00000001	0.00003538
35	Yes	4	0.00000001	0.00003559
36	Yes	4	0.00000001	0.00003614
37	Yes	4	0.00000001	0.00003666
38	Yes	4	0.00000001	0.00003678
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	185 - 180	7.181	39	0.3807	0.0468
T2	180 - 160	6.769	39	0.3786	0.0441
T3	160 - 140	5.208	39	0.3416	0.0392
T4	140 - 120	3.844	39	0.2872	0.0317
T5	120 - 100	2.722	39	0.2303	0.0236
T6	100 - 80	1.852	39	0.1757	0.0194
T7	80 - 60	1.178	39	0.1353	0.0150
T8	60 - 40	0.661	39	0.0944	0.0096
T9	40 - 20	0.314	39	0.0619	0.0067
T10	20 - 0	0.093	39	0.0309	0.0032

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	DB222	39	7.181	0.3807	0.0468	45524
174.00	APXVSPP18-C-A20	39	6.284	0.3718	0.0420	32789
164.00	DB846F65ZAXY	39	5.507	0.3515	0.0401	25789
151.00	7770.00	39	4.566	0.3178	0.0364	21563
145.00	DB222	39	4.163	0.3012	0.0339	20312
138.00	3-ft dish	39	3.720	0.2816	0.0308	19252

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	185 - 180	27.462	2	1.4552	0.1803
T2	180 - 160	25.889	2	1.4477	0.1698
T3	160 - 140	19.918	2	1.3064	0.1511
T4	140 - 120	14.699	2	1.0982	0.1218
T5	120 - 100	10.410	2	0.8806	0.0909
T6	100 - 80	7.082	2	0.6714	0.0748
T7	80 - 60	4.506	2	0.5170	0.0579
T8	60 - 40	2.531	2	0.3608	0.0371
T9	40 - 20	1.202	2	0.2363	0.0260
T10	20 - 0	0.355	2	0.1181	0.0123

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	DB222	2	27.462	1.4552	0.1803	12023
174.00	APXVSPP18-C-A20	2	24.035	1.4220	0.1615	8625
164.00	DB846F65ZAXY	2	21.060	1.3445	0.1542	6735
151.00	7770.00	2	17.463	1.2152	0.1401	5632
145.00	DB222	2	15.921	1.1518	0.1305	5311
138.00	3-ft dish	2	14.226	1.0767	0.1184	5038

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	185	Leg	A325N	0.7500	6	0.53	29.82	0.018 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	1.81	4.79	0.378 ✓	1	Member Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Top Girt	A325N	0.6250	1	0.98	5.22	0.187 ✓	1	Member Bearing
T2	180	Leg	A325N	0.7500	6	4.73	29.82	0.159 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	5.19	5.22	0.995 ✓	1	Member Bearing
		Top Girt	A325N	0.6250	1	0.20	5.22	0.038 ✓	1	Member Bearing
T3	160	Leg	A325N	1.0000	6	11.29	53.01	0.213 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	5.17	5.22	0.990 ✓	1	Member Bearing
		Top Girt	A325N	0.6250	1	0.13	5.22	0.024 ✓	1	Member Bearing
T4	140	Leg	A325N	1.0000	6	17.40	53.01	0.328 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	5.68	7.83	0.725 ✓	1	Member Bearing
T5	120	Leg	A325N	1.0000	6	22.66	53.01	0.427 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	7.27	12.43	0.585 ✓	1	Bolt Shear
T6	100	Leg	A325N	1.0000	6	28.09	53.01	0.530 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	7.49	12.43	0.603 ✓	1	Bolt Shear
T7	80	Leg	A325N	1.0000	6	32.91	53.01	0.621 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	8.95	9.46	0.946 ✓	1	Member Bearing
T8	60	Leg	A325N	1.2500	6	37.53	82.83	0.453 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	10.04	17.89	0.561 ✓	1	Bolt Shear
T9	40	Leg	A325N	1.2500	6	42.14	82.83	0.509 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	10.71	12.62	0.849 ✓	1	Member Bearing
T10	20	Leg	A449	1.5000	6	46.51	104.37	0.446 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	11.95	12.62	0.947 ✓	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	P2x.154	5.00	4.00	61.0 K=1.00	1.0745	-5.33	36.84	0.145 [1] ✓
T2	180 - 160	P2.5x.203	20.00	5.00	63.3 K=1.00	1.7040	-33.75	57.19	0.590 [1] ✓
T3	160 - 140	P2.5x.375	20.03	5.01	67.2 K=1.00	2.9452	-77.28	95.23	0.812 [1] ✓
T4	140 - 120	P3.5x.318	20.03	2.59	23.8 K=1.00	3.6784	-116.90	158.82	0.736 [1] ✓
T5	120 - 100	P5x.258	20.03	3.46	22.1 K=1.00	4.2999	-151.95	186.71	0.814 [1] ✓
T6	100 - 80	P5x.375	20.03	6.68	43.6	6.1120	-188.42	239.39	0.787 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	80 - 60	P5x.375	20.03	1.67	K=1.00 10.9	6.1120	-223.63	272.66	0.820 [1]
T8	60 - 40	P5x0.5	20.03	5.17	K=1.00 34.5	7.9529	-256.23	328.07	0.781 [1]
T9	40 - 20	P8x.322	20.03	5.15	K=1.00 21.0	8.3993	-289.19	365.93	0.790 [1]
T10	20 - 0	P8x.322	20.03	2.50	K=1.00 10.2	8.3993	-322.94	375.09	0.861 [1]
					K=1.00				

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	L2x2x1/8	6.40	2.96	96.9 K=1.09	0.4844	-1.94	9.41	0.206 [1]
T2	180 - 160	L2x2x1/8	7.07	3.25	103.5 K=1.06	0.4844	-5.36	8.79	0.610 [1]
T3	160 - 140	L2x2x1/8	8.40	4.09	123.4 K=1.00	0.4844	-5.24	6.99	0.750 [1]
T4	140 - 120	L2x2x3/16	10.08	4.87	148.4 K=1.00	0.7150	-5.79	7.34	0.789 [1]
T5	120 - 100	L2 1/2x2 1/2x5/16	12.58	6.09	149.5 K=1.00	1.4600	-7.27	14.75	0.493 [1]
T6	100 - 80	L2 1/2x2 1/2x5/16	14.32	6.96	170.9 K=1.00	1.4600	-7.49	11.29	0.663 [1]
T7	80 - 60	L3x3x3/16	7.90	7.38	107.2 K=1.14	1.0900	-9.95	19.03	0.523 [1]
T8	60 - 40	L3x3x3/8	19.30	9.53	194.9 K=1.00	2.1100	-10.03	12.55	0.799 [1]
T9	40 - 20	L3 1/2x3 1/2x1/4	21.03	10.26	177.3 K=1.00	1.6900	-11.87	12.14	0.977 [1]
T10	20 - 0	L3 1/2x3 1/2x1/4	11.18	10.51	117.9 K=1.02	1.6900	-13.65	26.35	0.518 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	80 - 60	L3x3x3/8	14.67	7.10	139.2 K=0.96	2.1100	-3.88	24.59	0.158 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T10	20 - 0	L3 1/2x3 1/2x1/2	20.50	9.89	161.0 K=0.93	3.2500	-5.60	28.32	0.198 [1]

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	140 - 120	L2x2x1/4	8.74	8.41	148.1 K=0.89	0.9380	-2.03	9.66	0.210 [1]
T5	120 - 100	L2 1/2x2 1/2x3/8	10.66	10.19	146.1 K=0.90	1.7300	-2.64	18.31	0.144 [1]
T8	60 - 40	L3x3x7/16	16.48	16.02	176.8 K=0.83	2.4300	-4.44	17.55	0.253 [1]
T9	40 - 20	L3x3x1/2	18.49	17.77	192.2 K=0.81	2.7500	-5.02	16.81	0.298 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	L2x2x1/8	5.00	4.56	137.7 K=1.00	0.4844	-0.88	5.77	0.153 [1]
T2	180 - 160	L2x2x1/8	5.00	4.56	137.7 K=1.00	0.4844	-0.12	5.77	0.021 [1]
T3	160 - 140	L2x2x1/8	5.00	4.52	136.5 K=1.00	0.4844	-0.20	5.88	0.034 [1]

[1] P_u / ϕP_n controls

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	80 - 60	L3x3x1/2	3.67	3.43	95.3 K=1.35	2.7500	-5.36	55.24	0.097 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T10	20 - 0	L3x3x1/2	5.13	4.77	109.0 K=1.11	2.7500	-7.50	47.69	0.157 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	80 - 60	L3x3x1/2	4.10	3.85	99.5 K=1.26	2.7500	-3.43	52.89	0.065 [1] ✔
T10	20 - 0	L3x3x1/2	5.82	5.41	115.6 K=1.04	2.7500	-5.08	44.08	0.115 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	P2x.154	5.00	4.00	61.0	1.0745	3.15	48.35	0.065 [1] ✔
T2	180 - 160	P2.5x.203	20.00	5.00	63.3	1.7040	28.39	76.68	0.370 [1] ✔
T3	160 - 140	P2.5x.375	20.03	5.01	67.2	2.9452	67.75	132.54	0.511 [1] ✔
T4	140 - 120	P3.5x.318	20.03	2.59	23.8	3.6784	104.52	165.53	0.631 [1] ✔
T5	120 - 100	P5x.258	20.03	3.46	22.1	4.2999	136.11	193.49	0.703 [1] ✔
T6	100 - 80	P5x.375	20.03	6.68	43.6	6.1120	168.55	275.04	0.613 [1] ✔
T7	80 - 60	P5x.375	20.03	1.67	10.9	6.1120	197.72	275.04	0.719 [1] ✔
T8	60 - 40	P5x0.5	20.03	5.17	34.5	7.9529	225.43	357.88	0.630 [1] ✔
T9	40 - 20	P8x.322	20.03	5.15	21.0	8.3993	253.30	377.97	0.670 [1] ✔
T10	20 - 0	P8x.322	20.03	2.50	10.2	8.3993	279.39	377.97	0.739 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	L2x2x1/8	6.40	2.96	58.9	0.4844	1.81	15.69	0.115 [1] ✓
T2	180 - 160	L2x2x1/8	7.07	3.25	64.5	0.4844	5.19	15.69	0.331 [1] ✓
T3	160 - 140	L2x2x1/8	8.40	4.09	80.6	0.4844	5.17	15.69	0.329 [1] ✓
T4	140 - 120	L2x2x3/16	9.65	4.66	92.9	0.7150	5.68	23.17	0.245 [1] ✓
T5	120 - 100	L2 1/2x2 1/2x5/16	12.58	6.09	98.0	1.4600	6.78	47.30	0.143 [1] ✓
T6	100 - 80	L2 1/2x2 1/2x5/16	14.32	6.96	111.7	1.4600	7.32	47.30	0.155 [1] ✓
T7	80 - 60	L3x3x3/16	7.90	7.38	97.8	1.0900	8.95	35.32	0.254 [1] ✓
T8	60 - 40	L3x3x3/8	19.30	9.53	127.1	2.1100	9.55	68.36	0.140 [1] ✓
T9	40 - 20	L3 1/2x3 1/2x1/4	21.03	10.26	114.4	1.6900	10.71	54.76	0.196 [1] ✓
T10	20 - 0	L3 1/2x3 1/2x1/4	11.18	10.51	118.7	1.6900	11.95	54.76	0.218 [1] ✓

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	80 - 60	L3x3x3/8	14.67	7.10	140.0	2.1100	3.88	68.36	0.057 [1] ✓
T10	20 - 0	L3 1/2x3 1/2x1/2	20.50	9.89	168.0	3.2500	5.60	105.30	0.053 [1] ✓

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	140 - 120	L2x2x1/4	8.74	8.41	165.7	0.9380	2.03	30.39	0.067 [1] ✔
T5	120 - 100	L2 1/2x2 1/2x3/8	10.66	10.19	162.4	1.7300	2.64	56.05	0.047 [1] ✔
T8	60 - 40	L3x3x7/16	16.48	16.02	212.4	2.4300	4.44	78.73	0.056 [1] ✔
T9	40 - 20	L3x3x1/2	18.49	17.77	237.4	2.7500	5.02	89.10	0.056 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	L2x2x1/8	5.00	4.56	92.0	0.4844	0.98	15.69	0.062 [1] ✔
T2	180 - 160	L2x2x1/8	5.00	4.56	92.0	0.4844	0.20	15.69	0.013 [1] ✔
T3	160 - 140	L2x2x1/8	5.00	4.52	91.2	0.4844	0.13	15.69	0.008 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	80 - 60	L3x3x1/2	3.67	3.43	45.9	2.7500	5.81	89.10	0.065 [1] ✔
T10	20 - 0	L3x3x1/2	5.13	4.77	63.7	2.7500	8.56	89.10	0.096 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	80 - 60	L3x3x1/2	3.95	3.70	49.4	2.7500	3.00	89.10	0.034 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T10	20 - 0	L3x3x1/2	5.82	5.41	72.3	2.7500	4.23	89.10	0.047 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	185 - 180	Leg	P2x.154	3	-5.33	36.84	14.5	Pass
T2	180 - 160	Leg	P2.5x.203	15	-33.75	57.19	59.0	Pass
T3	160 - 140	Leg	P2.5x.375	45	-77.28	95.23	81.2	Pass
T4	140 - 120	Leg	P3.5x.318	75	-116.90	158.82	73.6	Pass
T5	120 - 100	Leg	P5x.258	114	-151.95	186.71	81.4	Pass
T6	100 - 80	Leg	P5x.375	144	-188.42	239.39	78.7	Pass
T7	80 - 60	Leg	P5x.375	165	-223.63	272.66	82.0	Pass
T8	60 - 40	Leg	P5x0.5	285	-256.23	328.07	78.1	Pass
T9	40 - 20	Leg	P8x.322	306	-289.19	365.93	79.0	Pass
T10	20 - 0	Leg	P8x.322	327	-322.94	375.09	86.1	Pass
T1	185 - 180	Diagonal	L2x2x1/8	11	-1.94	9.41	20.6 37.8 (b)	Pass
T2	180 - 160	Diagonal	L2x2x1/8	22	-5.36	8.79	61.0 99.5 (b)	Pass
T3	160 - 140	Diagonal	L2x2x1/8	54	-5.24	6.99	75.0 99.0 (b)	Pass
T4	140 - 120	Diagonal	L2x2x3/16	78	-5.79	7.34	78.9	Pass
T5	120 - 100	Diagonal	L2 1/2x2 1/2x5/16	117	-7.27	14.75	49.3 58.5 (b)	Pass
T6	100 - 80	Diagonal	L2 1/2x2 1/2x5/16	147	-7.49	11.29	66.3	Pass
T7	80 - 60	Diagonal	L3x3x3/16	223	-9.95	19.03	52.3 94.6 (b)	Pass
T8	60 - 40	Diagonal	L3x3x3/8	288	-10.03	12.55	79.9	Pass
T9	40 - 20	Diagonal	L3 1/2x3 1/2x1/4	312	-11.87	12.14	97.7	Pass
T10	20 - 0	Diagonal	L3 1/2x3 1/2x1/4	385	-13.65	26.35	51.8 94.7 (b)	Pass
T7	80 - 60	Horizontal	L3x3x3/8	173	-3.88	24.59	15.8	Pass
T10	20 - 0	Horizontal	L3 1/2x3 1/2x1/2	335	-5.60	28.32	19.8	Pass
T4	140 - 120	Secondary Horizontal	L2x2x1/4	83	-2.03	9.66	21.0	Pass
T5	120 - 100	Secondary Horizontal	L2 1/2x2 1/2x3/8	122	-2.64	18.31	14.4	Pass
T8	60 - 40	Secondary Horizontal	L3x3x7/16	293	-4.44	17.55	25.3	Pass
T9	40 - 20	Secondary Horizontal	L3x3x1/2	314	-5.02	16.81	29.8	Pass
T1	185 - 180	Top Girt	L2x2x1/8	4	-0.88	5.77	15.3 18.7 (b)	Pass
T2	180 - 160	Top Girt	L2x2x1/8	16	-0.12	5.77	2.1 3.8 (b)	Pass
T3	160 - 140	Top Girt	L2x2x1/8	47	-0.20	5.88	3.4	Pass
T7	80 - 60	Redund Horz 1 Bracing	L3x3x1/2	194	-5.36	55.24	9.7	Pass
T10	20 - 0	Redund Horz 1 Bracing	L3x3x1/2	356	-7.50	47.69	15.7	Pass
T7	80 - 60	Redund Diag 1 Bracing	L3x3x1/2	204	-3.43	52.89	6.5	Pass
T10	20 - 0	Redund Diag 1 Bracing	L3x3x1/2	366	-5.08	44.08	11.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
							Summary	
						Leg (T10)	86.1	Pass
						Diagonal (T2)	99.5	Pass
						Horizontal (T10)	19.8	Pass
						Secondary Horizontal (T9)	29.8	Pass
						Top Girt (T1)	18.7	Pass
						Redund Horz 1 Bracing (T10)	15.7	Pass
						Redund Diag 1 Bracing (T10)	11.5	Pass
						Bolt Checks	99.5	Pass
						RATING =	**99.5**	**Pass**

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Subject:	FOUNDATION ANALYSIS
Location:	Weston, CT
Rev. 1: 5/8/19	Prepared by: T.J.L. Checked by: C.A.G. Job No. 19027.11

Pier and Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 5716 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$S_t := 55 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$WT_t := 56 \cdot kip$	(User Input from tnxTower)	
Max Compression Force =	$C_t := 333 \cdot kip$	(User Input from tnxTower)	
Max Uplift Force =	$U_t := 288 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 185 \cdot ft$	(User Input)	
Tower Width =	$W_t := 21 \cdot ft$	(User Input)	
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 2$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 6.5 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 5.0 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 3.5 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 1.5 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 30.5 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 4000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 32 \cdot deg$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_s := 12000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 7$	(User Input)	
Bar Diameter =	$d_{bpier} := 0.875 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 14$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 4 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 10$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.27 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 58$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 10$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.27 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 58$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area = $A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 0.601 \cdot in^2$

Pad Top Reinforcement Bar Area = $A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 1.267 \cdot in^2$

Pad Bottom Reinforcement Bar Area = $A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 1.267 \cdot in^2$

Coefficient of Lateral Soil Pressure = $K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3.255$

Load Factor = $LF := 1$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := if(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}) = 120 \cdot pcf$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 1.953 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}] = 1.953 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 2.539 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 2.246 \cdot ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)] = 1.5 \cdot ft$

$A_p := W_f \cdot T_p = 45.75 \cdot ft^2$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 102.739 \cdot kip$

Weight of Concrete = $WT_c := \left[\left(W_f^2 \cdot T_f\right) + (3) \cdot \left(\frac{d_p^2 \cdot \pi}{4} L_p\right)\right] \cdot \gamma_c = 230.954 \cdot kip$

Weight of Soil Above Footing = $WT_{s1} := \left[\left[W_f^2 - (3) \cdot \left(\frac{d_p^2 \cdot \pi}{4}\right)\right] \cdot \left(\left|L_p - L_{pag} - n\right|\right)\right] \cdot \gamma_s = 486.75 \cdot kip$

Weight of Soil Wedge at Back Face = $WT_{s2} := \left[\frac{(D_f - n)^2 \cdot \tan(\Phi_s)}{2} \cdot W_f\right] \cdot \gamma_s = 48.313 \cdot kip$

Foundation has undercut toe per Fred A. Nudd dwg 96-4992-1

Tower Offset = $X_{t1} := \left[\frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot deg))}{2}\right]$ $X_{t2} := \frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot deg))}{3}$

$X_t := if(Pos_t = 1, X_{t1}, X_{t2}) = 9.188$

$X_{off1} := \frac{W_f}{2} - \left[\frac{(W_t \cdot \cos(30 \cdot deg))}{3} + X_t\right] = 0$ $X_{off2} := 0$

$X_{off} := if(Pos_t = 1, X_{off1}, X_{off2})$ $X_{off} = 0 \cdot ft$

Total Weight = $WT_{tot} := 0.9WT_c + 0.75WT_{s1} = 572.9 \cdot kip$

Resisting Moment = $M_r := (WT_{tot}) \cdot \frac{W_f}{2} + 0.9WT_t \cdot \left(\frac{W_f}{2} - X_{off}\right) + 0.75\left(S_u \cdot \frac{T_p}{3}\right) + 0.75WT_{s2} \cdot \left[W_f + \frac{(D_f - n) \cdot \tan(\Phi_s)}{3}\right] = 10698 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := OM + S_t \cdot (L_p + T_f) = 6073.5 \cdot kip \cdot ft$

Foundation has undercut toe per Fred A. Nudd dwg 96-4992-1

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 1.76$

Factor of Safety Required = $FS_{req} := 1$ $OverTurning\_Moment\_Check := if(FS \geq FS_{req}, "Okay", "No Good")$

$OverTurning\_Moment\_Check = "Okay"$

Shear Capacity in Pier:

Shear Resistance of Pier = $S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS_{req}} = 360.553 \cdot kips$

$Shear\_Check := if(S_p > S_t, "Okay", "No Good")$

$Shear\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_{s1} + WT_t = 774 \cdot kip$

Area of the Mat = $A_{mat} := W_f^2 = 930.25$

Section Modulus of Mat = $S := \frac{W_f^3}{6} = 4728.77 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 2.116 \cdot ksf$

$Max\_Pressure\_Check := if(P_{max} < 0.75q_s, "Okay", "No Good")$

$Max\_Pressure\_Check = "Okay"$

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.453 \cdot ksf$

$Min\_Pressure\_Check := if[(P_{min} \geq 0) \cdot (P_{min} < 0.75q_s), "Okay", "No Good"]$

$Min\_Pressure\_Check = "No Good"$

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 8.375$

Distance to Kern = $X_k := \frac{W_f}{6} = 5.083$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{M_{ot}}{Load_{tot}} = 7.85$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot Load_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 2.285 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 2.285 \cdot ksf$

$Pressure\_Check := if(q_{adj} < 0.75q_s, "Okay", "No Good")$

$Pressure\_Check = "Okay"$

Concrete Bearing Capacity:

Strength Reduction Factor = $\Phi_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 3.062 \times 10^3 \cdot kips$ (ACI-2008 10.14)

$Bearing\_Check := if\left(P_b > LF \cdot C_t, "Okay", "No Good"\right)$

$Bearing\_Check = "Okay"$

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

$d := T_f - Cvr_{pad} - d_{bbot} = 13.73 \cdot in$

$FL := LF \cdot \frac{C_t}{W_f^2} = 0.358 \cdot ksf$

$V_{req} := FL \cdot \left(X_t - .5 \cdot d_p - d\right) \cdot W_f = 68.714 \cdot kips$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d = 540 \cdot kip$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No Good"\right)$

$Beam\_Shear\_Check = "Okay"$

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot \pi = 14.6$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot \left(d_p + d\right)^2}{4} = 16.9$

Required Shear Strength = $V_{req} := FL \cdot \left(W_f^2 - A_{bo}\right) = 327 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 516.9 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No Good"\right)$

$Punching\_Shear\_Check = "Okay"$

TOWER REINFORCEMENT DESIGN

T-MOBILE CT11121C
237 GODFREY ROAD EAST
WESTON, CT 06883

VICINITY MAP

NORTH

PROJECT SUMMARY

SITE ADDRESS:	237 GODFREY ROAD EAST WESTON, CT 06883
PROJECT COORDINATES:	LAT: 41°–14'–31.25"N LON: 73°–21'–51.50"W ELEV:±430 AMSL
T–MOBILE SITE REF.:	CT11121C
T–MOBILE CONTACT:	DAN REID 203.592.8291
ANTENNA CL HEIGHT:	185'–0"
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	TIMOTHY J. LYNN, PE 203.433.7507

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
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N–2	STRUCTURAL STEEL NOTES	0
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S–1	TOWER ELEVATION	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	5/21/19	TJL	CAG	ISSUED FOR CONSTRUCTION
0	5/7/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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237 GODFREY ROAD EAST
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DATE:	5/7/19
SCALE:	AS SHOWN
JOB NO.	19027.11

TITLE SHEET

SHEET NO.
T-1
Sheet No. 1 of 5

DESIGN BASIS

GOVERNING CODE: 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CT STATE SUPPLEMENT.

1. TIA–222–G, "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES"

2. DESIGN CRITERIA

WIND LOAD: (TOWER/FOUNDATION)
NOMINAL DESIGN WIND SPEED (V) = 93 MPH (2018 CSBC: APPENDIX 'N')

GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS AND REINFORCEMENT DESIGN PREPARED BY CENTEK ENGINEERING DATED 5/7/19.

2. THE TEMPORARY DETACHMENT AND/OR REPLACEMENT OF TOWER MEMBERS SHALL BE DONE ONE AT A TIME AND SHALL BE CONDUCTED ON DAYS WITH LESS THAN 15 MPH WIND PRESENT. NO MEMBER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY.

3. ALL REINFORCEMENT SHOWN HEREIN APPLIES TO ALL SIDES OF THE TOWER.

4. PROVIDE TEMPORARY ANCHORS, GUYING AND/OR BRACING AS REQUIRED TO SAFELY CONDUCT THE WORK.

5. ALL WORK SHALL BE IN ACCORDANCE WITH TIA–222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES".

6. THE TOWER STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER REINFORCEMENTS ARE COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE TOWER STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIE–DOWNS, WHICH MIGHT BE NECESSARY.

7. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

8. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.

9. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.

10. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.

11. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

12. TOWER REINFORCING SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF RADIO ANTENNAS AND SUPPORT STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.

13. EXISTING COAXIAL CABLES AND ALL ACCESSORIES SHALL BE TEMPORARILY RELOCATED AS NECESSARY AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH TOWER REINFORCEMENT.

14. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

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DATE: 5/7/19
SCALE: AS SHOWN
JOB NO. 19027.11

DESIGN BASIS AND GENERAL NOTES

SHEET NO.
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Sheet No. 2 of 5

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD).

2. MATERIAL SPECIFICATIONS

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI).
   C. STRUCTURAL STEEL (TOWER REINF. SOLID ROUND BAR)--- ASTM A572_GR50 (50 KSI)
   D. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   E. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   F. PIPE---ASTM A53 GRADE B (FY = 35 KSI)

3. FASTENER SPECIFICATIONS

   A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   B U-BOLTS---ASTM A307
   C. ANCHOR RODS---ASTM F1554
   D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.
   E. BLIND BOLTS---AS1252 PROPERTY CLASS 8.8 (FU=120 KSI).

4. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.

5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.

6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.

7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.

8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.

9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.

10. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.

11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".

12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

13. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.

15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.

16. ALL BOLTS SHALL BE INSTALLED PER THE REQUIREMENTS OF AISC 14TH EDITION & RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS".

17. ALL BOLTS SHALL BE INSTALLED AS SNUG-TIGHT CONNECTIONS UNLESS OTHERWISE INDICATED. CONNECTIONS SPECIFIED AS PRETENSIONED OR SLIP-CRITICAL SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN TABLE J3.1 OF AISC 14TH EDITION.

18. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.

19. LOAD INDICATOR WASHERS SHALL BE UTILIZED ON ALL PRETENSIONED OR SLIP-CRITICAL CONNECTIONS.

20. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.

21. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

22. FABRICATE BEAMS WITH MILL CAMBER UP.

23. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.

24. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

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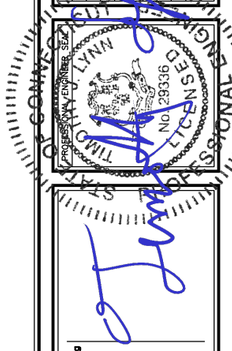

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STRUCTURAL STEEL NOTES

SHEET NO.
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MODIFICATION INSPECTION REPORT REQUIREMENTS

PRE-CONSTUCTION		DURING CONSTRUCTION		POST-CONSTRUCTION	
SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM
X	EOR MODIFICATION INSPECTION DRAWING	-	FOUNDATIONS	X	MODIFICATION INSPECTOR RECORD REDLINE DRAWING
-	EOR APPROVED SHOP DRAWINGS	-	EARTHWORK: BACKFILL MATERIAL & COMPACTION	-	POST-INSTALLED ANCHOR ROD PULL-OUT TEST
-	EOR APPROVED POST-INSTALLED ANCHOR MPII	-	REBAR & FORMWORK GEOMETRY VERIFICATION	X	PHOTOGRAPHS
-	FABRICATION INSPECTION	-	CONCRETE TESTING		
-	FABRICATOR CERTIFIED WELDER INSPECTION	X	STEEL INSPECTION		
X	MATERIAL CERTIFICATIONS	-	POST INSTALLED ANCHOR ROD VERIFICATION		
		-	BASE PLATE GROUT VERIFICATION		
		-	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON-SITE COLD GALVANIZING VERIFICATION		
		X	CONTRACTOR AS-BUILT REDLINE DRAWINGS		

NOTES:

1. REFER TO MODIFICATION INSPECTION NOTES FOR ADDITIONAL REQUIREMENTS
2. "X" DENOTES DOCUMENT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
3. "-" DENOTES DOCUMENT NOT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
4. EOR - ENGINEER OF RECORD
5. MPII - "MANUFACTURER'S PRINTED INSTALLATION GUIDELINES"

GENERAL

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF STRUCTURAL MODIFICATIONS, TO INCLUDE A REVIEW AND COMPILATION OF SPECIFIED SUBMITTALS AND CONSTRUCTION INSPECTIONS, AS AN ASSURANCE OF COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS PREPARED UNDER THE DIRECTION OF THE ENGINEER OF RECORD (EOR).

2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND GENERAL WORKMANSHIP AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. OWNERSHIP OF THE MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD.

3. TO ENSURE COMPLIANCE WITH THE MODIFICATION INSPECTION REQUIREMENTS THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR (MI) COMMENCE COMMUNICATION UPON AUTHORIZATION TO PROCEED BY THE CLIENT. EACH PARTY SHALL BE PROACTIVE IN CONTACTING THE OTHER. THE EOR SHALL BE CONTACTED IF SPECIFIC GC/MI CONTACT INFORMATION IS NOT MADE AVAILABLE.

4. THE GC SHALL PROVIDE THE MI WITH A MINIMUM OF 5 BUSINESS DAYS NOTICE OF IMPENDING INSPECTIONS.

5. WHEN POSSIBLE, THE GC AND MI SHALL BE ON SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY NOTED DEFICIENCIES ADDRESSED DURING THE INITIAL MODIFICATION INSPECTION.

MODIFICATION INSPECTOR (MI)

1. THE MI SHALL CONTACT THE GC UPON AUTHORIZATION BY THE CLIENT TO:

   - REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   - WORK WITH THE GC IN DEVELOPMENT OF A SCHEDULE FOR ON-SITE INSPECTIONS.
   - DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE MI IS RESPONSIBLE FOR COLLECTION OF ALL INSPECTION AND TEST REPORTS, REVIEWING REPORTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING ON-SITE INSPECTIONS AND COMPILATION & SUBMISSION OF THE MODIFICATION INSPECTION REPORT TO THE CLIENT AND THE EOR.

GENERAL CONTRACTOR (GC)

1. THE GC IS REQUIRED TO CONTACT THE GC UPON AUTHORIZATION TO PROCEED WITH CONSTRUCTION BY THE CLIENT TO:

   - REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   - WORK WITH THE MI IN DEVELOPMENT OF A SCHEDULE FOR ON-SITE INSPECTIONS.
   - DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE GC IS RESPONSIBLE FOR COORDINATING AND SCHEDULING IN ADVANCE ALL REQUIRED INSPECTIONS AND TESTS WITH THE MI.

CORRECTION OF FAILING MODIFICATION INSPECTION

1. SHOULD THE STRUCTURAL MODIFICATION NOT COMPLY WITH THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS, THE GC SHALL WORK WITH THE MODIFICATION INSPECTOR IN A VIABLE REMEDIATION PLAN AS FOLLOWS:

   - CORRECT ALL DEFICIENCIES TO COMPLY WITH THE CONTRACT DOCUMENTS AND COORDINATE WITH THE MI FOR A FOLLOW UP INSPECTION.
   - WITH CLIENT AUTHORIZATION, THE GC MAY WORK WITH THE EOR TO REANALYZE THE MODIFICATION USING THE AS-BUILT CONDITION.

REQUIRED PHOTOGRAPHS

1. THE GC AND MI SHALL AT MINIMUM PHOTO DOCUMENT THE FOLLOWING FOR INCLUSION IN THE MODIFICATION INSPECTION REPORT:

   - PRE-CONSTRUCTION: GENERAL CONDITION OF THE SITE.
   - DURING CONSTRUCTION: RAW MATERIALS, CRITICAL DETAILS, WELD PREPARATION, BOLT INSTALLATION & TORQUE, FINAL INSTALLED CONDITION & SURFACE COATING REPAIRS.
   - POST-CONSTRUCTION: FINAL CONDITION OF THE SITE

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MODIFICATION INSPECTION REQUIREMENTS

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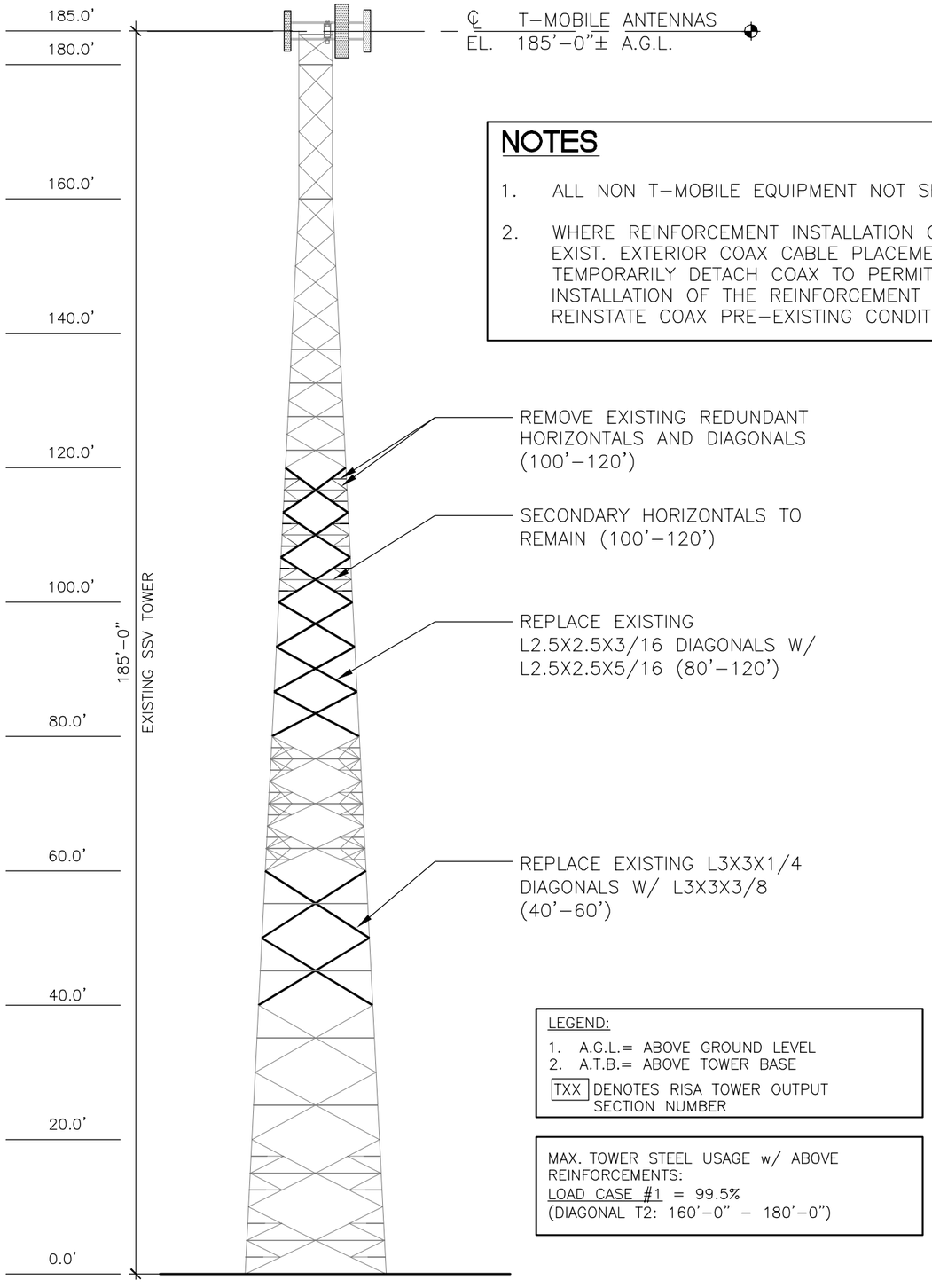

NOTES

1. ALL NON T-MOBILE EQUIPMENT NOT SHOWN FOR CLARITY
2. WHERE REINFORCEMENT INSTALLATION COINCIDES WITH EXIST. EXTERIOR COAX CABLE PLACEMENT. GC. TO TEMPORARILY DETACH COAX TO PERMIT THE INSTALLATION OF THE REINFORCEMENT THEN REINSTATE COAX PRE-EXISTING CONDITION

LEGEND:

1. A.G.L.= ABOVE GROUND LEVEL
2. A.T.B.= ABOVE TOWER BASE

[TXX] DENOTES RISA TOWER OUTPUT SECTION NUMBER

MAX. TOWER STEEL USAGE w/ ABOVE REINFORCEMENTS:
LOAD CASE #1 = 99.5%
(DIAGONAL T2: 160'-0" - 180'-0")

1 / S-1

TOWER ELEVATION - PROPOSED

SCALE: 1" = 20'-0"

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THIS DOCUMENT WAS PREPARED OR APPROVED BY ME AND THE CONNECTICUT STATUTES AND REGULATIONS. IT IS A VIOLATION OF LAW FOR ANY PERSON TO ALTER THIS DOCUMENT IN ANY WAY. IF ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE DOCUMENT HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE DATE OF SUCH ALTERATION.

Professional Engineer
LYNN D. GOUDREAU
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TOWER ELEVATION & FEEDLINE PLAN

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S-1
Sheet No. 5 of 5

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CT11121C

237 Godfrey Road East
Weston, CT

Centek Project No. 19027.11

Date: April 24, 2019

Max Stress Ratio =77.2%

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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CENTEK engineering

Centered on Solutions℠

April 24, 2019

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CT11121C
237 Godfrey Road East
Weston, CT 06883

Centek Project No. 19027.11

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting three (3) T frame sector mounts with stiff arms to support the proposed/existing equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- **T-Mobile:**
  T-Arms: Three (3) Ericsson AIR21 KRC118023-1_B2A_B4P panel antennas, three (3) RFS APXVAARR24-43-NA20 panel antennas, three (3) Ericsson KRD901146-1_B66A_B2A panel antennas, three (3) KRY112 TMAs and three (3) Ericsson 4449 B71_B12 remote radio units mounted on three (3) T-Arms with a RAD center elevation of 185-ft +/- AGL.

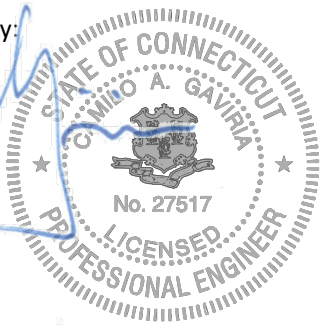
The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 93 mph for Weston as required in Appendix N of the 2018 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that **the existing T-frames are structurally adequate to support the proposed antenna configuration.** If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Camilo A. Gaviria, PE
Structural Engineer



Prepared by:

Fernando J. Palacios
Engineer

Section 2 - Calculations

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Branford, CT 06405 F: (203) 488-8587

Subject: Loads on Equipment

Location: Weston, CT

Rev. 0: 04/17/19

Prepared by: F.J.P Checked by: C.A.G.
Job No. 19027.11

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed	$V := 93$	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)

Input

Structure Type =	Structure_Type := Lattice		(User Input)
Structure Category =	SC := II		(User Input)
Exposure Category =	Exp := B		(User Input)
Structure Height =	$h := 180$	ft	(User Input)
Height to Center of Antennas =	$z := 126$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H = 1.12$		(User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if Structure\_Type} = \text{Pole} \\ 0.85 & \text{if Structure\_Type} = \text{Lattice} \end{cases} = 0.85$$

(Per Table 2-2 of TIA-222-G)

(Per Table 2-3 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.143$$

Velocity Pressure Coefficient Antennas =

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.715$$

$$Kz := 2.01 \cdot \left(\left(\frac{z}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.056$$

Velocity Pressure w/o Ice Antennas = $qz := 0.00256 \cdot K_d \cdot Kz \cdot V^2 \cdot I_{Wind} = 19.868$

Velocity Pressure with Ice Antennas = $qz_{ice} := 0.00256 \cdot K_d \cdot Kz \cdot V_i^2 \cdot I_{Wind} = 5.743$

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAARR24_43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 19.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 133.4$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.9$		
Antenna Force Coefficient =	$Ca_{ant} = 1.31$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 13.1$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 381$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 168$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 16$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 134$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.4$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 70$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 133$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \cdot 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \cdot 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 371$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 371$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR21 KRC118023-1_B2A_B4P		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 12.1$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 91.5$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.29$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 135$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.1$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 88$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.4$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 53$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 4.7$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 39$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 92$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5343$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5096$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 165$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 165$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson KRD901146-1_B66A_B2A		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56.65$	in	(User Input)
Antenna Width =	$W_{ant} := 12.87$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.66$	in	(User Input)
Antenna Weight =	$WT_{ant} := 132.2$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.4$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.1$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 145$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 97$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.8$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 56$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 42$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 132$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6314$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5526$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 179$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 179$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4449 B71B12		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 14.9$	in	(User Input)
RRUS Width =	$W_{RRUS} := 13.2$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 10.4$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 74$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 36$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 29$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 16$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.8$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 14$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 74$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2170$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 70$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 70$	lbs

Development of Wind & Ice Load on TMA's

TMA Data:

TMA Model =	Ericsson KRY112 TMA		
TMA Shape =	Flat	in	(User Input)
TMA Height =	$L_{TMA} := 6.9$	in	(User Input)
TMA Width =	$W_{TMA} := 6.1$	in	(User Input)
TMA Thickness =	$T_{TMA} := 2.8$	lbs	(User Input)
TMA Weight =	$WT_{TMA} := 11$		(User Input)
Number of TMA's =	$N_{TMA} := 1$		(User Input)
TMA Aspect Ratio =	$Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1.1$		
TMA Force Coefficient =	$Ca_{TMA} = 1.2$		

Wind Load (without ice)

Surface Area for One TMA =	$SA_{TMAF} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.3$	sf
Total TMA Wind Force =	$F_{TMA} := qz \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 8$	lbs
Surface Area for One TMA =	$SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.1$	sf
Total TMA Wind Force =	$F_{TMA} := qz \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 4$	lbs

Wind Load (with ice)

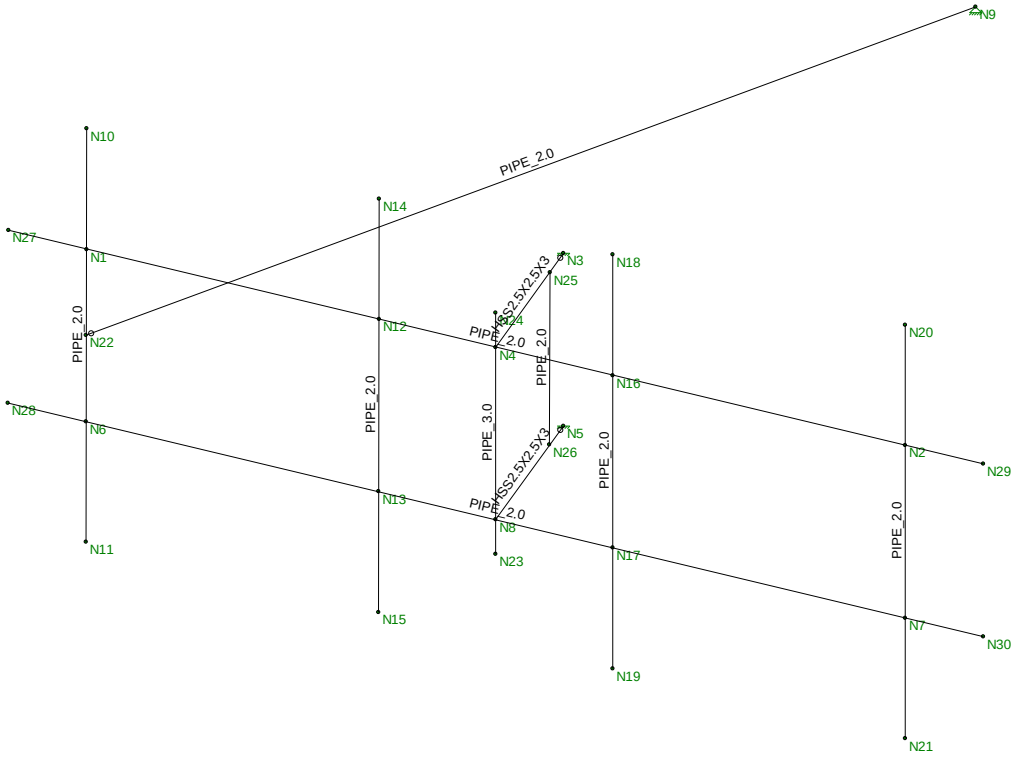
Surface Area for One TMA w/ Ice =	$SA_{ICETMAF} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 0.7$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 5$	lbs
Surface Area for One TMA w/ Ice =	$SA_{ICETMAS} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz})}{144} = 0.4$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 3$	lbs

Gravity Load (without ice)

Weight of All TMAs =	$WT_{TMA} \cdot N_{TMA} = 11$	lbs

Gravity Loads (ice only)

Volume of Each TMA =	$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 118$	cu in
Volume of Ice on Each TMA =	$V_{ice} := (L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 495$	cu in
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 16$	lbs
Weight of Ice on All TMAs =	$W_{ICETMA} \cdot N_{TMA} = 16$	lbs



Envelope Only Solution

Centek		
FJP	CT11121C_AMA	Apr 24, 2019 at 4:50 PM
19027.11	Member Framing	CT11121C_AMA.R3D

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Grade B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[..	Lcomp bot[..	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Antenna M...	6			Lbyy						Lateral
2	M2	Antenna M...	6			Lbyy						Lateral
3	M3	Antenna M...	6			Lbyy						Lateral
4	M4	Antenna M...	6			Lbyy						Lateral
5	M5	(E) Outrigg...	2.083	Segment	Segment	Segment	Segment	Segm...				Lateral
6	M6	(E) Horz	12.5	Segment	Segment	Segment	Segment	Segm...				Lateral
7	M7	(E) Stiff Arm	12.5			Lbyy						Lateral
8	M8	(E) Outrigg...	2.083	Segment	Segment	Segment	Segment	Segm...				Lateral
9	M9	(E) Horz	12.5	Segment	Segment	Segment	Segment	Segm...				Lateral
10	M10	(E)Vert	3.5			Lbyy						Lateral
11	M11	(E) Outrigg...	2.5									Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Desig...A [in2]	Iyy [i...	Izz [i...	J [in4]
1	(E)Vert	PIPE_3.0	Colu...	Pipe	A53 Grade B	Typical	2.07	2.85	2.85	5.69
2	(E) Outrigger	HSS2.5X2.5X3	Beam	Tube	A500 Gr.46	Typical	1.54	1.35	1.35	2.25
3	(E) Horz	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
4	(E) Stiff Arm	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
5	Antenna Mast	PIPE_2.0	Colu...	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
6	(E) Outrigger Brace	PIPE_2.0	Colu...	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N21	N20			Antenna Mast	Column	Pipe	A53 Grad...	Typical
2	M2	N19	N18			Antenna Mast	Column	Pipe	A53 Grad...	Typical
3	M3	N15	N14			Antenna Mast	Column	Pipe	A53 Grad...	Typical
4	M4	N11	N10			Antenna Mast	Column	Pipe	A53 Grad...	Typical
5	M5	N5	N8			(E) Outrigger	Beam	Tube	A500 Gr.46	Typical
6	M6	N28	N30			(E) Horz	Beam	Pipe	A53 Grad...	Typical
7	M7	N22	N9			(E) Stiff Arm	Beam	Pipe	A53 Grad...	Typical
8	M8	N3	N4			(E) Outrigger	Beam	Tube	A500 Gr.46	Typical
9	M9	N27	N29			(E) Horz	Beam	Pipe	A53 Grad...	Typical
10	M10	N24	N23			(E)Vert	Column	Pipe	A53 Grad...	Typical
11	M11	N25	N26			(E) Outrigger Brace	Column	Pipe	A53 Grad...	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N1	-0.250002	0	-0.	0	
2	N2	-10.750002	0	-0.	0	
3	N3	-5.500002	0	2.083333	0	
4	N4	-5.500002	0	-0.	0	
5	N5	-5.500002	-2.5	2.083333	0	
6	N6	-0.250002	-2.5	-0.	0	
7	N7	-10.750002	-2.5	-0.	0	
8	N8	-5.500002	-2.5	-0.	0	
9	N9	-7.3975	-1.25	10.255	0	
10	N10	-0.250002	1.75	-0.	0	
11	N11	-0.250002	-4.25	-0.	0	
12	N12	-4.000002	0	-0.	0	
13	N13	-4.000002	-2.5	-0.	0	
14	N14	-4.000002	1.75	-0.	0	
15	N15	-4.000002	-4.25	-0.	0	
16	N16	-7.000002	0	-0.	0	
17	N17	-7.000002	-2.5	-0.	0	
18	N18	-7.000002	1.75	-0.	0	
19	N19	-7.000002	-4.25	-0.	0	
20	N20	-10.750002	1.75	-0.	0	
21	N21	-10.750002	-4.25	-0.	0	
22	N22	-0.250002	-1.25	-0.	0	
23	N23	-5.500002	-3	-0.	0	
24	N24	-5.500002	.5	-0.	0	
25	N25	-5.500002	0	1.666666	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
26	N26	-5.500002	-2.5	1.666666	0	
27	N27	0.749998	0	-0.	0	
28	N28	0.749998	-2.5	-0.	0	
29	N29	-11.750002	0	-0.	0	
30	N30	-11.750002	-2.5	-0.	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N9	Reaction	Reaction	Reaction			
2	N3	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N5	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N25						
5	N26						

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.066	1
2	M1	Y	-.066	5.667
3	M2	Y	-.067	1
4	M2	Y	-.067	5.833
5	M4	Y	-.046	1
6	M4	Y	-.046	5.833
7	M2	Y	-.074	3
8	M4	Y	-.011	3

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.089	1
2	M1	Y	-.089	5.667
3	M2	Y	-.185	1
4	M2	Y	-.185	5.833
5	M4	Y	-.083	1
6	M4	Y	-.083	5.833
7	M2	Y	-.07	3
8	M4	Y	-.016	3

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	-.021	1
2	M1	X	-.021	5.667
3	M2	X	-.035	1
4	M2	X	-.035	5.833
5	M4	X	-.019	1
6	M4	X	-.019	5.833
7	M2	X	-.014	3
8	M4	X	-.003	3

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	-.049	1
2	M1	X	-.049	5.667
3	M2	X	-.084	1
4	M2	X	-.084	5.833
5	M4	X	-.044	1
6	M4	X	-.044	5.833
7	M2	X	-.029	3
8	M4	X	-.004	3

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	-.028	1
2	M1	Z	-.028	5.667
3	M2	Z	-.067	1
4	M2	Z	-.067	5.833
5	M4	Z	-.027	1
6	M4	Z	-.027	5.833
7	M2	Z	-.016	3
8	M4	Z	-.005	3

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	-.072	1
2	M1	Z	-.072	5.667
3	M2	Z	-.191	1
4	M2	Z	-.191	5.833
5	M4	Z	-.068	1
6	M4	Z	-.068	5.833
7	M2	Z	-.036	3
8	M4	Z	-.008	3

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (i...
No Data to Print ...			

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M5	X	-.001	-.001	0	0
2	M8	X	-.001	-.001	0	0
3	M10	X	-.002	-.002	0	0
4	M11	X	-.001	-.001	0	0
5	M7	X	-.001	-.001	0	0
6	M3	X	-.00082	-.00082	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M5	X	-.004	-.004	0	0

Member Distributed Loads (BLC 5 : Wind X) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
2	M8	X	-.004	-.004	0	0
3	M10	X	-.006	-.006	0	0
4	M11	X	-.004	-.004	0	0
5	M7	X	-.004	-.004	0	0
6	M3	X	-.003	-.003	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	-.00082	-.00082	0	0
2	M2	Z	-.00082	-.00082	0	0
3	M3	Z	-.00082	-.00082	0	0
4	M4	Z	-.00082	-.00082	0	0
5	M6	Z	-.00082	-.00082	0	0
6	M9	Z	-.00082	-.00082	0	0
7	M1	Z	-.00082	-.00082	0	0
8	M10	Z	-.002	-.002	0	0
9	M7	Z	-.001	-.001	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	-.003	-.003	0	0
2	M2	Z	-.003	-.003	0	0
3	M3	Z	-.003	-.003	0	0
4	M4	Z	-.003	-.003	0	0
5	M6	Z	-.003	-.003	0	0
6	M9	Z	-.003	-.003	0	0
7	M10	Z	-.006	-.006	0	0
8	M7	Z	-.004	-.004	0	0

Basic Load Cases

	BLC Description	Category	X Gr...	Y Gr...	Z Gr...	Joint	Point	Distri...	Area(...	Surface(Plate/Wall)
1	Self Weight	None		-1						
2	Equipment Weight	None					8			
3	Ice Weight	None					8			
4	Wind w/ Ice X	None					8	6		
5	Wind X	None					8	6		
6	Wind w/ Ice Z	None					8	9		
7	Wind Z	None					8	8		

Load Combinations

	Description	Solve	P...	SR...	BLC	F...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-direction)	Yes	Y		1	1...	2	1.2	5	1.6																
2	0.9D + 1.6W (X-direction)	Yes	Y		1	.9	2	.9	5	1.6																
3	1.2D + 1.0Di + 1.0Wi (X...	Yes	Y		1	1...	2	1.2	3	1	4	1														
4	1.2D + 1.6W (X-direction)	Yes	Y		1	1...	2	1.2	7	1.6																
5	0.9D + 1.6W (X-direction)	Yes	Y		1	.9	2	.9	7	1.6																
6	1.2D + 1.0Di + 1.0Wi (X...	Yes	Y		1	1...	2	1.2	3	1	6	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N9	max	.127	4	.026	1	.405	2	0	6	0	6	0	6
2		min	-.237	2	.019	5	-.138	4	0	1	0	1	0	1
3	N3	max	.666	1	.828	6	1.64	4	0	6	0	6	-.078	5
4		min	0	5	.315	2	.301	2	0	1	0	1	-.255	3
5	N5	max	.399	2	.808	3	.131	5	0	6	0	6	-.077	5
6		min	-.245	6	.265	5	-1.39	3	0	1	0	1	-.257	3
7	Totals:	max	.804	2	1.654	6	1.466	5						
8		min	0	4	.64	2	0	1						

Envelope Joint Displacements

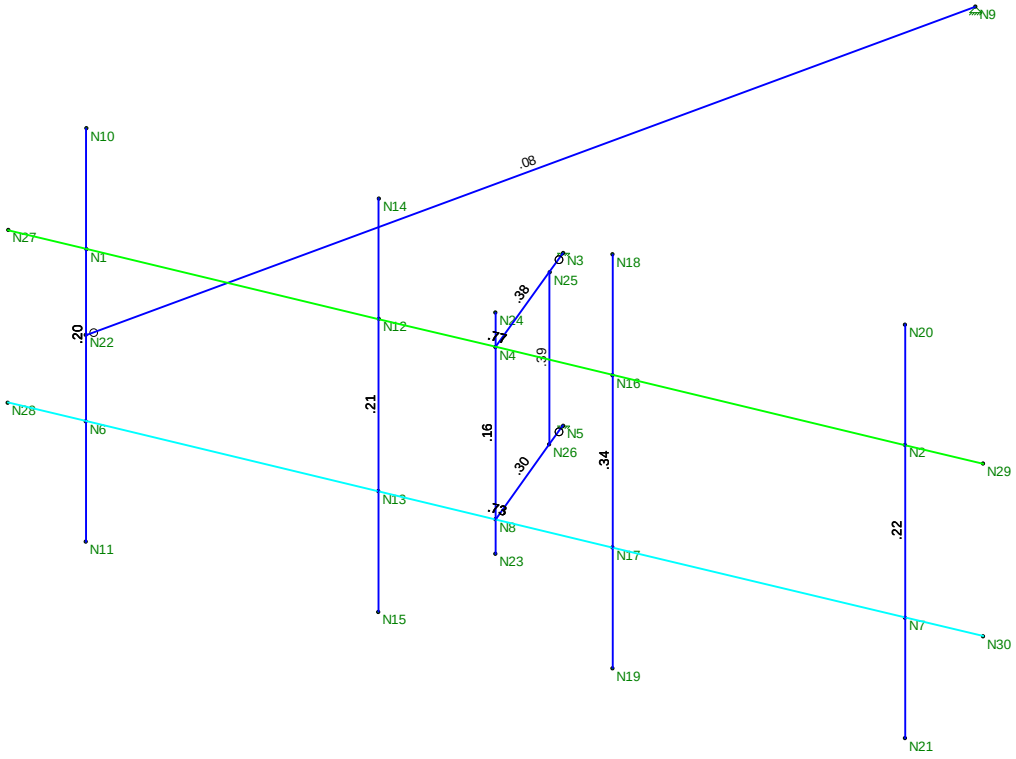
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	.801	5	-.022	2	.542	5	-1.206e-03	3	2.63e-03	4	1.28e-03	3
2		min	-.788	1	-.097	6	-.56	1	-2.529e-03	4	-3.256e-04	2	4.48e-04	5
3	N2	max	.8	5	-.176	5	1.691	2	7.622e-05	3	2.672e-02	2	4.691e-03	3
4		min	-.789	1	-.5	3	-3.104	5	-3.581e-03	5	-5.585e-02	5	1.524e-03	5
5	N3	max	0	6	0	6	0	6	0	6	0	6	0	6
6		min	0	1	0	1	0	1	0	1	0	1	0	1
7	N4	max	.8	5	-.029	2	0	2	-3.513e-04	2	2.747e-02	1	2.906e-03	3
8		min	-.788	1	-.076	6	0	4	-9.482e-04	6	-3.211e-02	5	8.681e-04	5
9	N5	max	0	6	0	6	0	6	0	6	0	6	0	6
10		min	0	1	0	1	0	1	0	1	0	1	0	1
11	N6	max	.83	4	-.022	2	.597	4	8.837e-04	2	2.072e-03	5	1.311e-03	3
12		min	-.746	2	-.097	6	-.549	2	-1.345e-03	4	-3.192e-04	2	9.233e-06	5
13	N7	max	.831	4	-.176	5	1.694	1	2.923e-04	6	2.682e-02	1	4.5e-03	6
14		min	-.745	2	-.5	3	-3.055	4	-1.292e-04	1	-5.539e-02	4	1.522e-03	5
15	N8	max	.831	4	-.029	2	0	3	-2.326e-04	5	2.678e-02	2	2.928e-03	3
16		min	-.745	2	-.076	6	0	5	-8.938e-04	3	-3.252e-02	4	8.616e-04	5
17	N9	max	0	6	0	6	0	6	-3.009e-03	2	1.065e-02	2	6.323e-04	6
18		min	0	1	0	1	0	1	-5.322e-03	6	-3.591e-03	4	-6.502e-04	1
19	N10	max	.792	5	-.022	2	.471	5	-1.207e-03	3	2.63e-03	4	1.595e-03	1
20		min	-.816	1	-.097	6	-.595	1	-3.921e-03	4	-3.256e-04	2	4.481e-04	5
21	N11	max	.833	4	-.022	2	.619	4	8.834e-04	2	2.072e-03	5	1.255e-03	3
22		min	-.73	2	-.097	6	-.567	2	-1.107e-03	6	-3.192e-04	2	9.23e-06	5
23	N12	max	.801	5	-.015	2	.409	5	-4.775e-04	2	1.381e-02	1	1.141e-03	3
24		min	-.788	1	-.048	6	-.364	1	-8.472e-04	6	-1.473e-02	5	1.23e-04	5
25	N13	max	.831	4	-.015	2	.423	4	-9.591e-05	2	1.359e-02	2	1.128e-03	3
26		min	-.745	2	-.048	6	-.356	2	-7.713e-04	6	-1.551e-02	4	1.765e-04	5
27	N14	max	.798	5	-.015	2	.394	5	-4.775e-04	2	1.381e-02	1	1.148e-03	3
28		min	-.802	1	-.048	6	-.376	1	-8.545e-04	6	-1.473e-02	5	1.23e-04	5
29	N15	max	.836	4	-.015	2	.432	4	-9.591e-05	2	1.359e-02	2	1.121e-03	3
30		min	-.734	2	-.048	6	-.354	2	-7.641e-04	6	-1.551e-02	4	1.765e-04	5
31	N16	max	.8	5	-.06	5	.488	2	2.118e-05	3	2.689e-02	2	5.544e-03	3
32		min	-.788	1	-.172	3	-.728	5	-3.26e-03	5	-4.627e-02	5	1.798e-03	5
33	N17	max	.831	4	-.06	5	.485	2	1.432e-03	4	2.694e-02	1	5.391e-03	3
34		min	-.745	2	-.172	3	-.716	4	-2.11e-05	1	-4.538e-02	4	1.801e-03	5
35	N18	max	.762	5	-.06	5	.487	2	2.122e-05	3	2.689e-02	2	5.99e-03	3
36		min	-.882	1	-.172	3	-.854	5	-7.085e-03	5	-4.627e-02	5	1.799e-03	5
37	N19	max	.882	4	-.06	5	.485	1	2.319e-03	4	2.694e-02	1	5.356e-03	6
38		min	-.707	2	-.172	3	-.762	4	-2.109e-05	1	-4.538e-02	4	1.765e-03	2

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
39	N20	max	.768	5	-.176	5	1.69	2	7.632e-05	3	2.672e-02	2	4.906e-03	3
40		min	-.862	1	-.5	3	-3.198	5	-4.775e-03	5	-5.585e-02	5	1.525e-03	5
41	N21	max	.874	4	-.176	5	1.697	1	4.652e-04	4	2.682e-02	1	4.494e-03	6
42		min	-.712	2	-.5	3	-3.064	4	-1.291e-04	1	-5.539e-02	4	1.518e-03	2
43	N22	max	.817	4	-.022	2	.571	4	-3.58e-04	2	2.351e-03	4	3.456e-03	3
44		min	-.77	2	-.097	6	-.54	2	-1.865e-03	4	-3.224e-04	2	1.092e-03	5
45	N23	max	.838	4	-.029	2	.006	3	-2.322e-04	5	2.678e-02	2	2.928e-03	3
46		min	-.737	2	-.076	6	.001	5	-8.938e-04	3	-3.252e-02	4	8.616e-04	5
47	N24	max	.795	5	-.029	2	-.002	2	-3.513e-04	2	2.747e-02	1	2.906e-03	3
48		min	-.797	1	-.076	6	-.006	6	-9.483e-04	6	-3.211e-02	5	8.681e-04	5
49	N25	max	.16	5	-.006	2	0	2	-1.155e-03	5	3.308e-02	1	6.092e-04	3
50		min	-.167	1	-.017	3	0	4	-3.084e-03	3	-3.203e-02	5	1.855e-04	5
51	N26	max	.168	4	-.006	2	0	3	-1.167e-03	2	3.115e-02	2	6.151e-04	3
52		min	-.157	2	-.017	6	0	5	-3.095e-03	6	-3.345e-02	4	1.844e-04	5
53	N27	max	.801	5	-.014	2	.511	5	-1.206e-03	3	2.638e-03	4	1.273e-03	3
54		min	-.788	1	-.082	6	-.556	1	-2.529e-03	4	-3.256e-04	2	4.428e-04	5
55	N28	max	.83	4	-.011	2	.572	4	8.837e-04	2	2.079e-03	5	1.304e-03	3
56		min	-.746	2	-.083	6	-.545	2	-1.345e-03	4	-3.192e-04	2	4.079e-06	5
57	N29	max	.8	5	-.195	5	2.012	2	7.622e-05	3	2.672e-02	2	4.697e-03	3
58		min	-.789	1	-.556	3	-3.775	5	-3.581e-03	5	-5.585e-02	5	1.529e-03	5
59	N30	max	.831	4	-.195	5	2.016	1	2.923e-04	6	2.682e-02	1	4.507e-03	6
60		min	-.745	2	-.554	3	-3.72	4	-1.292e-04	1	-5.539e-02	4	1.527e-03	5

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Me...	Shape	Code C...	Loc...	LC	Shear C...	Loc[ft]	Dir	LC	phi*Pn...	phi*P...	phi*Mn...	phi*...	Cb	Eqn
1	M1	PIPE_2.0	.217	4.25	3	.035	4.25		6	20.867	32.13	1.872	1.872	4.375	H1-1b
2	M2	PIPE_2.0	.337	4.25	3	.054	4.25		5	20.867	32.13	1.872	1.872	4.409	H1-1b
3	M3	PIPE_2.0	.212	4.25	6	.049	4.25		6	20.867	32.13	1.872	1.872	4.987	H1-1b
4	M4	PIPE_2.0	.202	1.75	3	.039	4.25		4	20.867	32.13	1.872	1.872	4.065	H1-1b
5	M5	HSS2.5X2.5...	.304	2.0...	6	.114	0	y	3	61.829	63.756	4.554	4.554	2.15	H1-1b
6	M6	PIPE_2.0	.730	6.25	4	.119	6.25		4	31.275	32.13	1.872	1.872	1.93	H1-1b
7	M7	PIPE_2.0	.079	6.25	1	.004	12.5		1	6.295	32.13	1.872	1.872	1.136	H1-1b
8	M8	HSS2.5X2.5...	.384	2.0...	1	.113	0	y	3	61.829	63.756	4.554	4.554	2.146	H1-1b
9	M9	PIPE_2.0	.772	6.25	4	.169	6.25		5	31.275	32.13	1.872	1.872	1.93	H1-1b
10	M10	PIPE_3.0	.157	.51	6	.086	.51		3	61.066	65.205	5.749	5.749	1.856	H1-1b
11	M11	PIPE_2.0	.387	2.5	6	.150	2.5		3	29.81	32.13	1.872	1.872	2.272	H1-1b



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
FJP	CT11121C_AMA	Apr 24, 2019 at 4:51 PM
19027.11	Member Unity Check	CT11121C_AMA.R3D

EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11121C

CT121/Weston Transfer_FT
237 Godfrey Road East
Weston, Connecticut 06883

May 17, 2019

EBI Project Number: 6219001675

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**6.55%**

21 B Street, Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting

environmental | engineering | due diligence

May 17, 2019

T-Mobile
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, Connecticut 06002

Emissions Analysis for Site: CT11121C - CT121/Weston Transfer_FT

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **237 Godfrey Road East** in **Weston, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 237 Godfrey Road East in Weston, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

8) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antennas used in this modeling are the Ericsson AIR32 B66A_B2A for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s), the Ericsson AIR21 B2A_B4P for the 1900 MHz / 2100 MHz channel(s) in Sector A, the Ericsson AIR32 B66A_B2A for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s), the Ericsson AIR21 B2A_B4P for the 1900 MHz / 2100 MHz channel(s) in Sector B, the Ericsson AIR32 B66A_B2A for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s), the Ericsson AIR21 B2A_B4P for the 1900 MHz / 2100 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antenna mounting height centerline of the proposed antennas is 185 feet above ground level (AGL).

11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

12) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR32 B66A_B2A	Make / Model:	Ericsson AIR32 B66A_B2A	Make / Model:	Ericsson AIR32 B66A_B2A
Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.85 dBd
Height (AGL):	185 feet	Height (AGL):	185 feet	Height (AGL):	185 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	8,728.31	ERP (W):	8,728.31	ERP (W):	8,728.31
Antenna A1 MPE %:	**0.92%**	Antenna B1 MPE %:	**0.92%**	Antenna C1 MPE %:	**0.92%**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 700 MHz	Frequency Bands:	600 MHz / 700 MHz	Frequency Bands:	600 MHz / 700 MHz
Gain:	12.95 dBd / 13.35 dBd	Gain:	12.95 dBd / 13.35 dBd	Gain:	12.95 dBd / 13.35 dBd
Height (AGL):	185 feet	Height (AGL):	185 feet	Height (AGL):	185 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	2,481.08	ERP (W):	2,481.08	ERP (W):	2,481.08
Antenna A2 MPE %:	**0.60%**	Antenna B2 MPE %:	**0.60%**	Antenna C2 MPE %:	**0.60%**
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Ericsson AIR21 B2A_B4P	Make / Model:	Ericsson AIR21 B2A_B4P	Make / Model:	Ericsson AIR21 B2A_B4P
Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd	Gain:	15.35 dBd / 15.35 dBd	Gain:	15.35 dBd / 15.35 dBd
Height (AGL):	185 feet	Height (AGL):	185 feet	Height (AGL):	185 feet
Channel Count:	6	Channel Count:	6	Channel Count:	6
Total TX Power (W):	180 Watts	Total TX Power (W):	180 Watts	Total TX Power (W):	180 Watts
ERP (W):	6,169.82	ERP (W):	6,169.82	ERP (W):	6,169.82
Antenna A3 MPE %:	**0.65%**	Antenna B3 MPE %:	**0.65%**	Antenna C3 MPE %:	**0.65%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	2.17%
Weston Police, Fire, EMS	0.07%
Weston Public Works	0.02%
Sprint	1.88%
Verizon	2.1%
AT&T	0.31%
Site Total MPE % :	6.55%

T-Mobile Sector A Total:	2.17%
T-Mobile Sector B Total:	2.17%
T-Mobile Sector C Total:	2.17%
Site Total:	6.55%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 1900 MHz LTE PCS	2	2056.61	185.0	4.32	1900 MHz LTE PCS	1000	0.43%
T-Mobile 2100 MHz LTE AWS	2	2307.55	185.0	4.85	2100 MHz LTE AWS	1000	0.48%
T-Mobile 600 MHz LTE	2	591.73	185.0	1.24	600 MHz LTE	400	0.31%
T-Mobile 700 MHz LTE	2	648.82	185.0	1.36	700 MHz LTE	467	0.29%
T-Mobile 1900 MHz GSM	4	1028.30	185.0	4.32	1900 MHz GSM	1000	0.43%
T-Mobile 2100 MHz UMTS	2	1028.30	185.0	2.16	2100 MHz UMTS	1000	0.22%
						Total:	**2.17%**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	2.17%
Sector B:	2.17%
Sector C:	2.17%
T-Mobile Maximum MPE % (Sector A):	2.17%
Site Total:	6.55%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.55%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.